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the beat. The orderly succession of these time-values in a definite mathematical relationship gives our notation the designation of *orthochronic* (from the Greek *ortho*, meaning "correct," and *chronos*, meaning "time").

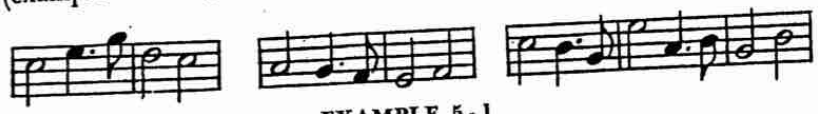
This established and regular relation between the various written notes is illustrated by the accompanying Table of Notes. In this table the longest time-value is the double whole-note, though this value appears very rarely in ordinary practice. Beginning with the double whole-note, each succeeding note-value represents exactly one-half the preceding value, and twice that of the next lower note-value.

As tables are included in this manual only with the aim of becoming the automatic resource of the notator and the performer, a quick visual organization of the Table of Notes may be used to assist memorization. These general observations might be made:

1. That outside of the fairly obsolete double whole-note, there are only two *open* note-heads: the *whole* note and the *half* note.
2. That these two forms are easily distinguished: the whole note by the *absence* of a stem; the half note by the *presence* of a stem.
3. That the filled-in, or black, note-form can represent some six different values, depending upon the number of *flags* employed.
4. That the black note-head is never used without a stem.
5. That a stem without any flags represents one of two different note-values: the half note 𝅗𝅥 and the quarter note ♩.

## STEMS

For *stem direction*, the general rules are simple. When the note-head is *above* the center line of the staff, the stem (Fr. *queue*, pl. *queues;* Ger. *Hals*, pl. *Hälse;* It. *asta*, pl. *aste*, or *gamba*, pl. *gambe*) goes *down* (example at the left, below). When the note is *below* the middle line of the staff, the stem goes *up* (center example). When the note is centered on the staff (on the third line), the stem *may* go in either direction, although it is the more common practice to draw it *down* (example at the right).



EXAMPLE 5-1

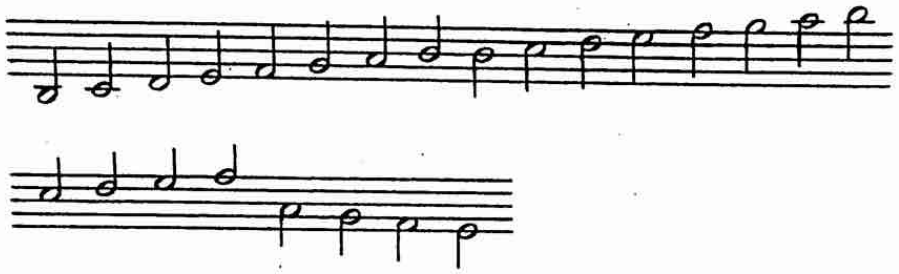
Proper *stem length* is proportional: that is, it is measured in terms of the note-position on the staff. Generally the stem length is one octave (eight staff degrees), which means that the end of the stem touches the



EXAMPLE 5-2. TABLE OF NOTES

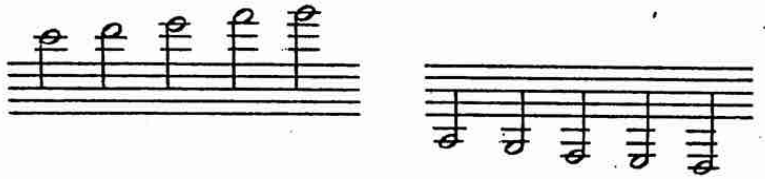
| Note symbol | American | British | Terminology: French | German | Italian |
|---|---|---|---|---|---|
| 𝅜 | Double whole-note | Breve | Double-ronde | Doppelganze or Doppelganzenote | Breve |
| 𝅝 | Whole note | Semibreve | Ronde | Ganze or Ganzenote | Semibreve |
| 𝅗𝅥 | Half note | Minim | Blanche | Halbe or Halbenote | Minima or Bianca |
| ♩ | Quarter note | Crochet | Noire | Viertel or Viertelnote | Semiminima or Nera |
| ♪ | Eighth note | Quaver | Croche | Achtel or Achtelnote | Croma |
| 𝅘𝅥𝅯 | Sixteenth note | Semiquaver | Double-croche | Sechzehntel or Sechzehntelnote | Semicroma |
| 𝅘𝅥𝅰 | Thirty-second note | Demisemiquaver | Quadruple-croche | Zweiunddreissigstel or Zweiunddreissigstelnote | Biscroma |
| 𝅘𝅥𝅱 | Sixty-fourth note | Hemidemisemiquaver | Octuple-croche | Vierundsechzigstel or Vierundsechzigstelnote | Semibiscroma |
| 𝅘𝅥𝅲 | One hundred and twenty-eighth note | Semihemidemisemiquaver | Cent-vingt-huitième (note) | Hundert und achtundzwanzigstel or Hundert und achtundzwanzigstelnote | Cento-ventottavo (nota) |

line or space an octave higher or lower than its note-head. This principle is not literally observed when the end of the stem is extended above the second added space over the staff (for upward stems) or below the second added space under the staff (for downward stems) as shown below. Such stems are usually somewhat shortened (second line of music).



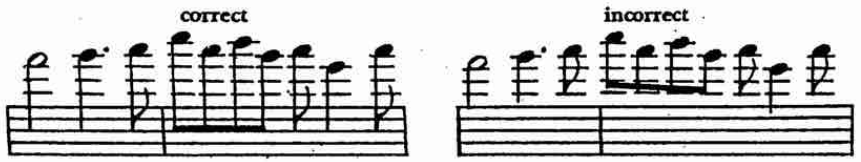
EXAMPLE 5-3

For all note-heads that lie higher than the second added space above the staff, a downward stem-end touches the middle staff line (left, below); likewise, for all note-heads positioned lower than the second added space below the staff, upward stems are similarly drawn to the middle line (right, below).



EXAMPLE 5-4

Careful comparison of the two examples below will demonstrate the greater clarity of this unorthodox notational practice. If the stems here were proportional throughout, they would become somewhat lost among ledger lines, especially if flags were joined to the stems. The addition of beams (see Chapter 6) would further obscure the ledger lines.



EXAMPLE 5-5

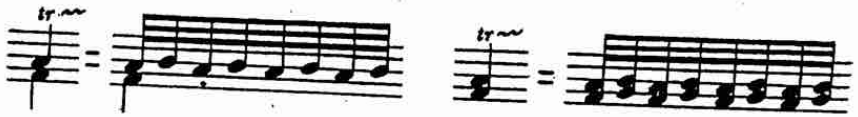
If one or two flags (see also pages 79–80) are joined to the stem, the length of the stem remains the same as for half notes and quarter notes. Three flags (for the 32nd note) require an even longer stem. Generally speaking, for each additional flag beyond the eighth-note or sixteenth-note forms, the stem is lengthened by two staff degrees.

EXAMPLE 5-6

## TRADITIONAL PRACTICES

Choice of note-size and stem-length, matters of placement on the staff—all are strictly regulated for the sake of clarity, and not as devious tortures. In order that the notator and the performer may be familiar with the situations most frequently recurring, they are described below under headings designed to make them readily accessible.

**1. Trills** Separate stems are required when out of a structure of two or more notes only one note is trilled (example at the left, below). If one should write a single stem connecting both notes, it would indicate that both notes are to be trilled (right, below). (See also material on trills, pages 232–234.)




EXAMPLE 5-7

**2. Ossia Passages** Alternate, or *ossia*, notes (refer to page 31) in instrumental parts, in sonatas for chamber ensemble, or in vocal and choral music are always written in small notes, whether on a supplementary staff or on the normal staff. Frequently they are also enclosed in parentheses.

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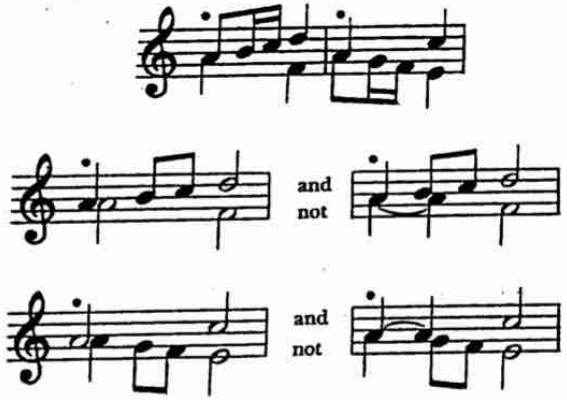
EXAMPLE 5-8

**3. Double-stemmed Unisons** In contrapuntal music two different voices often come together on a unison note, a fact that the notator must make clear by a very exact indication. If the time-value of a unison note is the same in both voices, a single note-head with stems up and down usually suffices.

EXAMPLE 5-9

A double stem on a single note-head may be used when the rhythmic distinction of either stem is quite clear, as in the first example, below. But separate note-heads with stems up and down are absolutely essential when the basic unit for counting is different, as in the second and third lines of music.




EXAMPLE 5-10

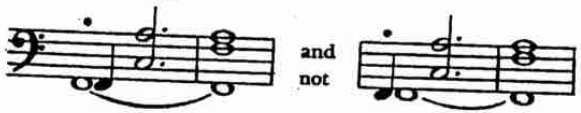
When two separate note-heads are required for a unison, it is important to differentiate the voices clearly. The note having its stem *up* (almost invariably the upper voice) is positioned first, to the left, while the note with a *downward* stem (lower voice, usually) goes to the right



—as shown in the previous two lower examples. The validity of thi principle is especially apparent when the down-stemmed note is dotte (left-hand example below). When, however, the upward-stemmed not is dotted, it is positioned to the right so that the dot will not be ob scured (right, below).

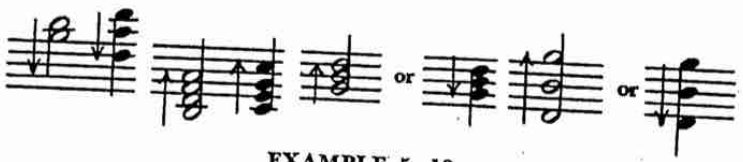
EXAMPLE 5-11

A unison note sometimes consists of a stemmed note and an unstemmed one (as a quarter note or a half note next to a whole note). It is better to put the stemmed note to the right, so that its stem does not touch the whole note.




EXAMPLE 5-12

**4. Intervals, Chords** Intervals (involving two note-heads) or chords (three or more note-heads) may use a single stem to join all the notes as a unit provided they are of equal value. The direction of the stem has to be determined by the general position of the chord or interval on the staff. If most of the notes lie at the *top* of the staff, the stem will ordinarily go *down* (far left, below). If the chord is positioned on the *bottom* part of the staff, the stem usually goes *up* (left center). When chord notes are both high and low on the staff, the direction of the stem has to be determined by the *available room* above or below the staff (right center and far right). Common sense should determine which direction is best for visual clarity.



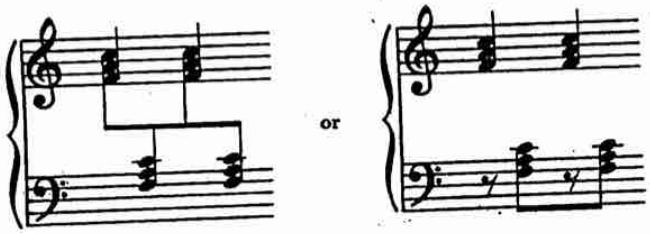

EXAMPLE 5-13

Even when the rhythmic values are equal, *two stems* rather than one may be required to outline a voice-leading. Note-heads and stems are then arranged as shown in Example 5-14.

Two stems are also required on a chord if it serves two *different rhythmic functions*, such as the sustained quarter-notes and the alter-

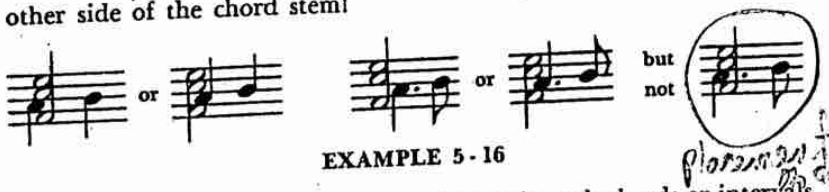
EXAMPLE 5-14

nating eighth-note pattern seen in the left-hand example below. This pattern can also be correctly notated as shown at the right.




EXAMPLE 5-15

When an inner note of a static chord moves to another pitch—that is, when its time-value is different from that of the other chord members—the note should be placed *outside* of the rest of the chord, with its stem going in the opposite direction (left, below). If, however, the moving voice begins with a dotted note, this must always be placed to the right of the chord proper (center, below); otherwise the dot will interfere with the chord notes. It most certainly cannot be put at the other side of the chord stem!

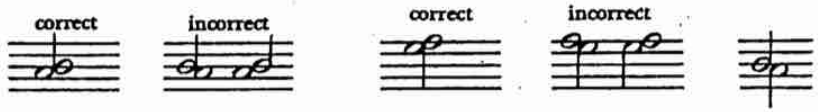



EXAMPLE 5-16

The necessity for clear placement of stems in such chords or intervals is illustrated in Example 5-17. From the notation at the left, one is not sure whether the upper two notes are held (as interpreted by the center illustration) or whether only the highest note is to be sustained as a quarter note (the interpretation shown at the right). Either

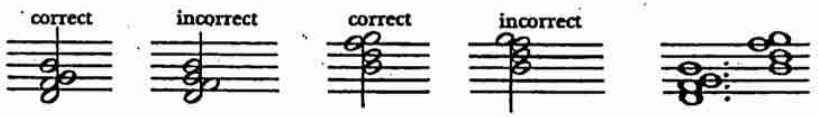
of the latter two notations is perfectly clear in meaning, while the left-hand notation is not.

The interval of a *second* (the two notes on adjacent scale-steps) should be written with the stem *between* the note-heads (Example 5-18). The higher pitch is always placed to the *right*, never to the left, regardless of stem direction. When, however, *separate stems* must be used for seconds, they are usually aligned vertically; the higher note is then placed to the left (example at the right, below).



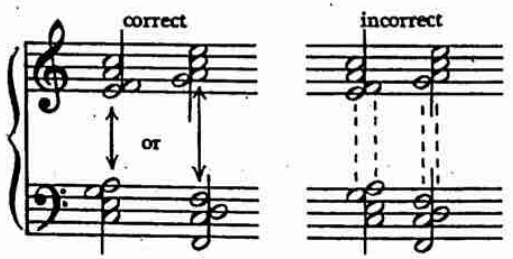

EXAMPLE 5-18

Likewise, chords consisting of notes of equal duration and containing tones a second apart should be written with the stem centered between the component note-heads of this interval. Observe that the "adjacent" tone (which creates the interval of the second) is placed to the *right* of the chord when the stem is *upward*, and to the *left* of the chord when the stem goes *down* (left and center examples). If the chord consists of unstemmed notes—whole notes or dotted whole-notes—the note placement is exactly the same as though a stem were being used (example at the right).




EXAMPLE 5-19

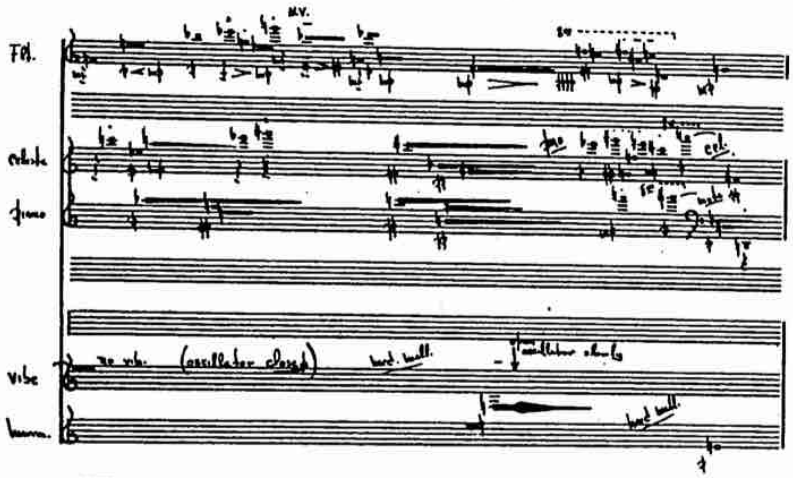
With intervals or chords that contain seconds, the rule for vertical alignment is the same whether the two structures are on one staff or divided between two or more. The note-heads that determine stem direction are aligned perpendicularly from top to bottom (as shown below on two staves).




EXAMPLE 5-20

## MODERN INNOVATIONS

**1. Note Shapes** Throughout musical history, unorthodox note-shapes have frequently appeared as the notational code of one composer, and this is no less true in our own century (refer to Example K). A case in point is the "time-notation" of the American avant-gardist Earle Brown. To show the duration of individual notes this composer elongates the note-heads (minus stems) instead of using the standard shapes traditionally placed. For example:

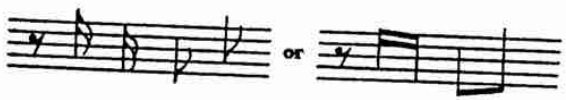



**EXAMPLE 5-21.** Earle Brown: From *Hodograph I* (1959)

Berio, on the other hand, usually employs conventional note-heads with stems for his own brand of "time notation," but places them at linear distances from note to note proportionate to their "distances" in time. (See Example 27-1.) Though both systems have a logic quite independent of the conventional note-symbols, reading such music necessitates a complete re-education of the eye.

**2. Stemming Without Note-heads** Among the interesting variants of stemming in modern music notation is the use of a stem, with or without flags and beams, not attached to any note-head. This device is used by some composers for spoken words in a choral composition or for the *Sprechstimme* effect.



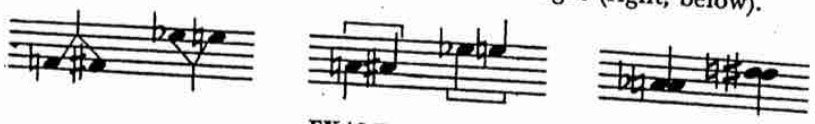



**EXAMPLE 5-22**

Small stems, appropriately flagged or beamed but again not attache to note-heads, have been used by Béla Bartók and certain other cor posers to mark off pulsations in an extended *glissando*. The stem therefore, are used to show the beats of the measure and have n precise pitch significance.

**EXAMPLE 5-23**

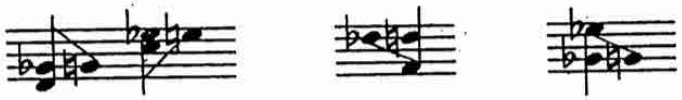
**3. Stemming Altered Unisons** One of the most intriguing modern stemming problems relates to *altered unisons*: a single note that is to be played simultaneously in two forms—as a natural and a flat (G natural and G flat, for instance); or as a natural and a sharp (C natural and C sharp). Two problems are actually present: where to place the accidentals (see Chapter 9), and where to put the stem(s). The first problem is solved by putting the correct accidental before each of the written note-heads. The stemming question is answered in a variety of ways. One solution is to begin the stems on the normally correct side of the note-head; that is, to the left if the stem goes *down*, and to the right if the stem goes *up*. Then both stems are bent inward to join a common perpendicular stem, up or down (example at the left, below). Another way of notating altered unisons is to write the two notes with normal stems—one up, one down—with a *bracket* placed over or under the two notes to show that they are to be played simultaneously (center, below). Still another method is to write a double note-head with single stem and two accidental signs (right, below).



**EXAMPLE 5-24**

When more than the two notes of an altered unison are involved in a chord structure or cluster, a single stem joins the notes that do *not* comprise the altered unison. Note that, in the examples shown at the left below, the central common stem has to be considerably lengthened so as to accommodate the bent stem joining it.

When three or more notes are present in the context of an altered unison, and one of these pitches is somewhat removed from the unison, the following notational variant is used: the common stem joins the highest and lowest notes of the structure, and the stem of the inner note is bent to join the common stem just above the lowest written note (examples at the right).



EXAMPLE 5-25

Another variation of this modern stemming problem occurs when the two lowest members of the chord are the altered unison notes. In the instance below it would be too crowded to bend the f♯′ stem to join the common stem in the middle; therefore, it is bent upward from the bottom of a normal perpendicular stem to join the lower end of the stem linking f♯′ and d″.

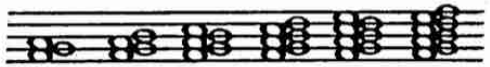
EXAMPLE 5-26

For an altered unison combined with an adjacent scale-step, a straight stem goes up or down from the middle note, the other two stems being bent to join it as in the examples given below. Note that the altered unison shown below is separated by the lowest *sounding* note; this is done to show the three different pitches more clearly.

EXAMPLE 5-27

**4. Clusters** In keyboard chords or sonorities that are cluster-like in formation—meaning they contain many tones a second apart—the component notes should be arranged by lines and spaces. That is to say, all the notes occupying *spaces* are vertically aligned together, and all those on *lines* are likewise vertically aligned. This principle holds good regardless of the number of notes in the sonority—whether three, four, five, or more.





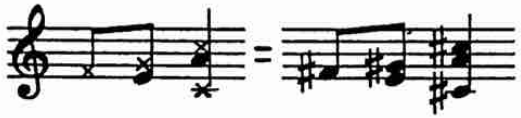
EXAMPLE 5-28

In densely constructed clusters containing too many notes to write individually, only the top and bottom pitches are written, with a thick vertical bar drawn from one note-center to the other. If the outer limits of the cluster formation exceed a single staff, two staves may be employed, and the thick bar used to join the note-heads on each separate staff. (See Examples 18-33 and 18-34.)

## SUGGESTED PRACTICES

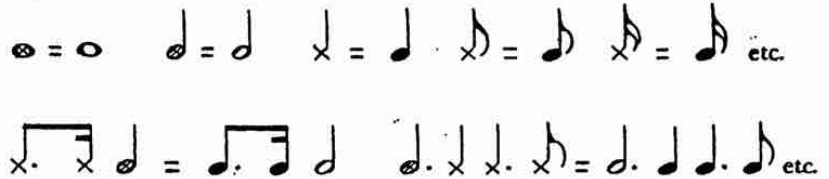
Though modern orthochronic notation varies the stems and flags added to the note-heads to indicate their relative time-values, the note-heads themselves are uniformly of one shape. If the other elements may vary, we may well ask why the note-shape itself may not occasionally be altered to serve a useful function.

Proposals for changing the existing note-shapes are periodically advanced by eccentrics and serious musicians alike. One such proposal, made in 1919 by the Russian Nicolas Obouhov, suggested that all accidentals could be eliminated by notating sharped notes (or their enharmonic equivalents) as X's rather than standard oval notes preceded by a sharp sign.



EXAMPLE 5-29

Rhythmic values were to be indicated as follows:

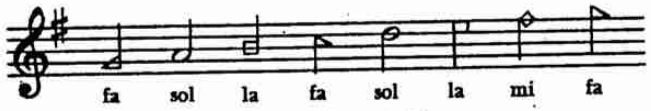



EXAMPLE 5-30

Other than in compositions by Obouhov himself and two brief piano pieces by Arthur Honegger, this proposed system has made no noticeable impact on the current development of notation.

The triangular-shaped note is used by some orchestral composers for—of all instruments—the triangle! A cross, or ✕ , is also used by many orchestrators as notation for certain percussion instruments of indefinite pitch, such as cymbals or drums (see pages 365 and 367). And the diamond-shaped note has long been used in string notation to designate a harmonic (see page 385). Other than the diamond notes for string harmonics, however, these odd note-shapes have had only sporadic use.

Yet there is a sensible historic precedent for shaped notes in the hymns, spirituals, and fuguing tunes of the southern United States; and in the *fasola* (fa-sol-la) system of solmization (singing with scale-syllables) much used in both England and the United States during the seventeenth and eighteenth centuries. Around 1802 a vocal instruction book was put out by one William Little, who utilized the following note-forms for a seven-note scale:




EXAMPLE 5-31

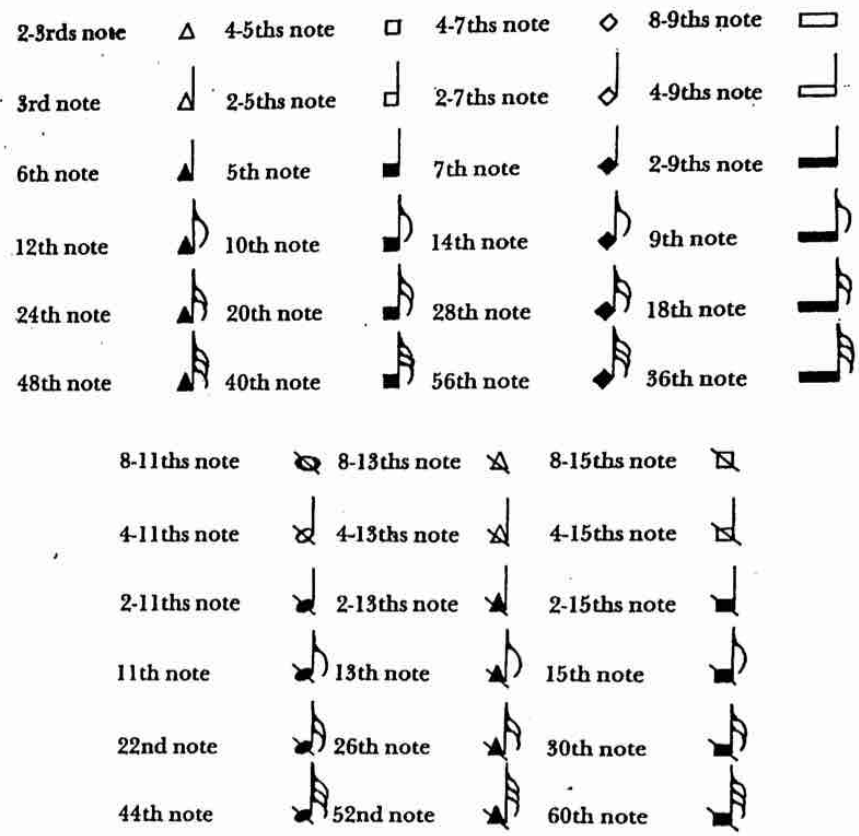
Even today Mr. Little's four note-shapes may be found in such hymn-tune collections as *The Sacred Harp,* first published around 1850. But their function is to indicate not time-values but only a position in the scale.

Why not, I propose, overcome ingrained habit when it hampers us? Why not utilize the advantages of shaped notes in modern music by employing them in the metric and rhythmic sense, as Henry Cowell suggested in his admirable *New Musical Resources*? This proposal, I realize, cannot be given weighty consideration until the aspirant notator has completed the material on notating meters (Chapter 10), but it does concern note-heads and so is presented here as a preview —to be returned to at a later and more learned hour. Here, then, is the essence of the scheme:

Because we have no single symbols in notation that express rhythmic units other than one (the whole note) and its divisions (the half note, quarter note, eighth note, and so on), Cowell suggested the employment of new note-shapes to express three, five, seven, and higher values that cannot now be notated by means of a single sign. The chart on the opposite page shows the proposed note-shapes and their values.

In spite of the logic and conciseness of Cowell's proposal, it has made no more impact on modern notation than Obouhov's suggestion, previously discussed.






EXAMPLE 5-32

## NOTATION EXERCISES

1. Add stems to the following note-heads according to the principles of stem direction:

EXAMPLE 5-33

2. In the following example change the direction of the stems wherever required. Place each stem on the proper side of the note-head, and lengthen or shorten it to the correct proportion.

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EXAMPLE 6-1

For each additional flag beyond two, the stem is extended by two staff degrees, and the new flag is drawn parallel to the previous one(s), with the additional curved line joining the curved line of the first flag. As previously stated, flags always go to the *right* of the stem, regardless of whether the stem goes up or down (see page 63).

The 64th note and the 128th note are somewhat uncommon in today's music, doubtless because they are clumsy to notate. Besides, the eye does not quickly take in four or five flags, or their equivalent in beaming.

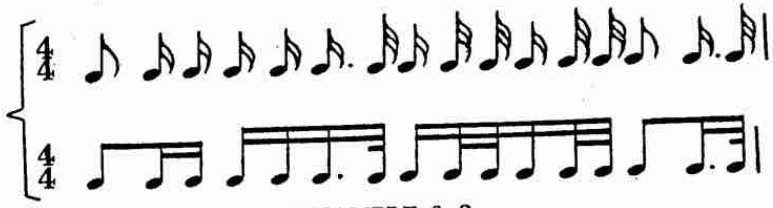
On the other hand, both 16ths and 32nds are quite common both as small note-values and as beats in a measure. Signatures of $\frac{9}{16}$, $\frac{12}{16}$, or of $\frac{3}{32}$, $\frac{8}{32}$, and so on may be found in much contemporary music (see Chapter 10). But to find 64th and 128th notes copiously employed one must go back to such nineteenth-century works as the piano and chamber music of Beethoven. See, for instance, the opening pages of the *Sonata Pathétique* for piano. Other works of Beethoven illustrating the use of 128th notes include: *Piano Sonata in c minor,* Op. 10, No. 1 (*Molto adagio*); *Piano Sonata in E-flat major,* Op. 27, No. 1 (*Adagio*); *Violin Sonata,* Op. 47, "*Kreutzer*" (fourth variation of the *Andante*); *Violin Sonata,* Op. 30, No. 2 (*Adagio*).

## BEAMS

*Beams* (Fr. *barre,* pl. *barres;* Ger. *Balken,* pl. *Balken;* It. *barra,* pl. *barre*), first introduced into music notation in the early eighteenth century, are compound flags used to connect notes in note-groups. The number of beams (sometimes called *ligatures*) always equals the number of flags appropriate for each note. Groups of eighth notes, for example, require one beam; of sixteenth notes, two beams; of 32nd notes, three beams; of 64th notes, four beams; and of 128th notes, five beams. Although minor variations in size occur even in published music, beams are normally the thickness of half a staff space. Eighth- and sixteenth-note beams may be accommodated on the usual stem length of one octave; for each additional beam the stem is extended one staff degree. This principle applies also to notes on ledger lines above or below the staff; if these stems touch the center staff-line, they must be lengthened, too, for three or more attached beams.

Beams are obviously serviceable: they visually demonstrate the metrical and rhythmic divisions within the measure (and, as we shall see later in the chapter, also indicate note-groupings in opposition to the normal patterns of the measure). No comment is necessary to point out the superior clarity of the beamed example below as opposed to the contrasting dense forest of individual flags outlining the same pattern.



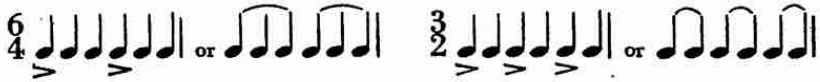


EXAMPLE 6-2

The visual advantages of beaming can be further illustrated by a comparison of the following two versions of a compound two-beat meter (see material on meters, Chapter 10).

EXAMPLE 6-3

In the example at the left above, no beams are required—the meter being $\frac{6}{4}$, with the quarter note as the counting unit. However, it is not immediately obvious to the eye what the pulsation actually is: it could be either 3 plus 3 (normal for a six-count measure—left, below) or 2 plus 2 plus 2 (normal for a three-count measure—right). Only the use of accents or phrase-marks (as shown below) would indicate the division desired by the composer.

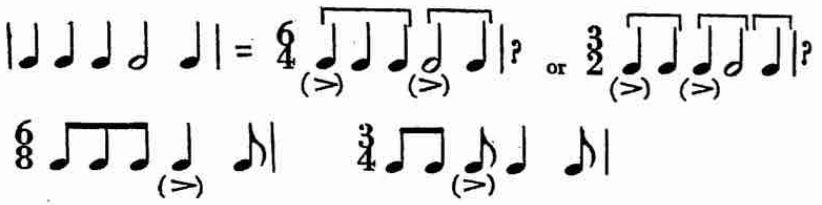



EXAMPLE 6-4

When, however, the same pattern is beamed—as in the $\frac{6}{8}$ version paired with the first $\frac{6}{4}$ version (Example 6-3)—the beams immediately show the *natural division* of the measure, so that accents or phrasing are not necessary in the metric sense, and can be reserved to indicate expressive qualities in the music.

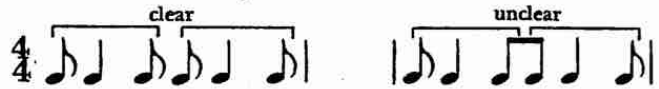
If different note-values are brought into the measure groups, the use of beaming for clarity is even more firmly dictated. The unbeamed pattern of the example on the first line below might signify either $\frac{6}{4}$ (compound duple time) or $\frac{3}{2}$ (syncopation in triple time). But if we should change the notation to correctly beamed and flagged $\frac{6}{8}$ or $\frac{3}{4}$, it

would be immediately evident what basic pulse was required (examples on the second line).



EXAMPLE 6-5

Still, the aspirant notator must not be misled into considering beaming a medicine for all ills. It is more accurate to employ simple flagging rather than beams when beams would confuse the subdivision of the measure rather than make it more clear. A simple syncopated figure, for instance, is often better notated with flags rather than by beaming two adjacent eighth-notes, for such beaming disguises the normal measure division between the second and third beats.

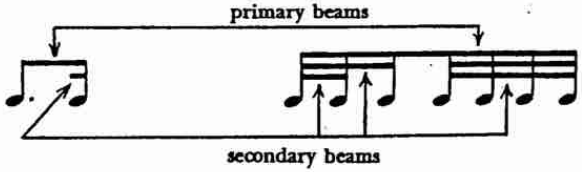



EXAMPLE 6-6

In the section that follows, we shall discuss under appropriate headings some flagging and beaming problems frequently met, and outline the logic underlying at least one satisfactory solution for each problem.

## TRADITIONAL PRACTICES

**1. Primary Beams** Beams are most usefully considered in two categories: primary and secondary. *Primary beams* are those that link an entire note-group; in other words, the primary beam is an unbroken one. *Secondary beams* are those that are interrupted or else are partially broken.




EXAMPLE 6-7

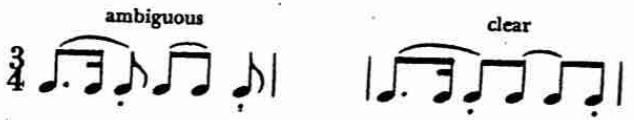
Note-stems should always extend to the primary beam, going through all secondary beams, as shown in the example at the left, below. A



few foreign editions (French, mainly) print beams as shown at the right, but the overwhelming bulk of printed music employs the method first illustrated.

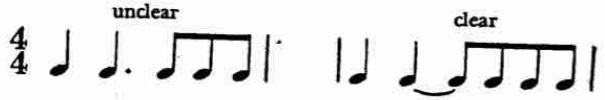
EXAMPLE 6-8

Primary beams must always make clear the *inner divisions* of the meter. If the notator must choose between flagging and beaming, it will be on this basis. In the example at the left below, for instance, the use of flagged notes (which might be indicated because of the staccato dots) makes the passage appear as a possible $\frac{6}{8}$. Beamed as in the example at the right, it is clearly in $\frac{3}{4}$.




EXAMPLE 6-9

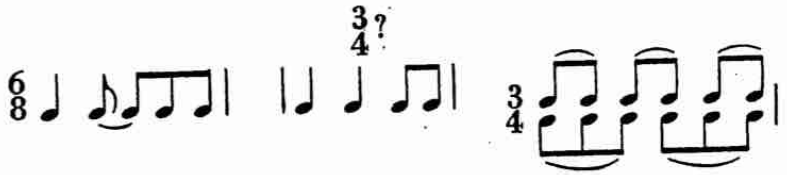
If there are dotted notes (see Chapter 8) that obscure the normal division of the measure (example at the left, below) it may be better to substitute a tied note for the dot and thus extend the beam (example at the right).




EXAMPLE 6-10

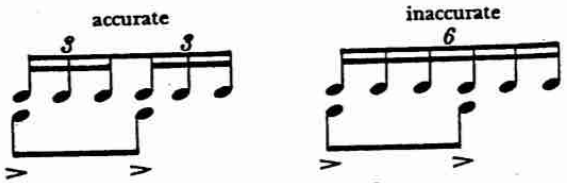
The normal division to be observed in a $\frac{6}{8}$ measure—♫ ♫—must be kept in mind when the value of a quarter note is substituted for two eighth-notes. The example at the left below correctly indicates the two groups of three by tieing two eighth-notes, so that the beaming may show a group of three. The example in the center would incorrectly indicate a $\frac{3}{4}$ measure, and would be justified only if a pronounced three-against-two rhythm were demanded (see Chapter 11). When, however, there is simultaneous use of compound duple and simple triple time—as in the first movement of Brahms's *Symphony No. 2 in D major,* at letter **B**—a patently $\frac{6}{8}$ beaming is frequently encountered in $\frac{3}{4}$ measure.

**2. Secondary Beams** For secondary beams, as for primary beams, the fundamental rule is that they must always be broken in



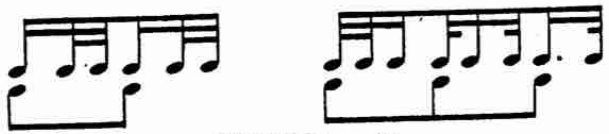
EXAMPLE 6 - 11

such a way as to indicate correctly the *measure rhythm*. For this reason, the example at the left below is obviously more accurate than the one at the right.




EXAMPLE 6 - 12

The general procedure for achieving this clarity is to break the secondary beams according to the smaller units of the beat. If the beat is a quarter note (as in $\frac{2}{4}$, $\frac{3}{4}$, $\frac{4}{4}$, $\frac{5}{4}$, and so on), the units would be *two* eighth-notes per beat (beaming shown at the left, below). If the beat is a dotted quarter (in $\frac{12}{8}$, $\frac{9}{8}$, $\frac{6}{8}$, $\frac{3}{8}$), then the units within each beat would be equal to *three* eighth-notes (example at the right). Observe again that the stems go through the secondary beams; it is not considered correct to notate otherwise.



EXAMPLE 6 - 13

**3. Broken Beams** All secondary beams are by definition broken in some way, but here we shall consider especially those broken beams illustrating some general principle. First, *mixed rhythmic values* have to be expressed by breaking one or more secondary beams. When the flagged notes at the left below are combined under a beam (center example below), it must be noted that the broken beam is always placed *inside* the group, never outside it!

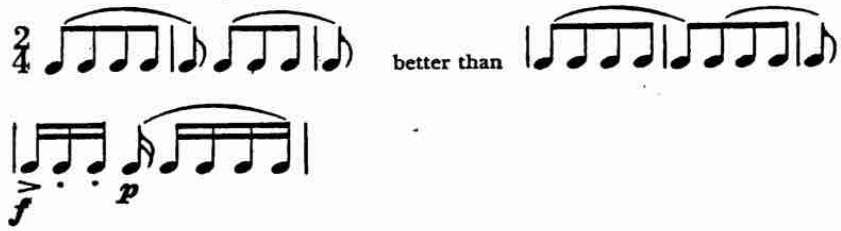
EXAMPLE 6 - 14



When such broken beams are used within groups of three, four, or more notes, the broken beam points in the direction of the note of which it is a fraction (left-hand examples on next page). The principle is more apparent if we think of the first figure notated as on the second line of Example 6-15.

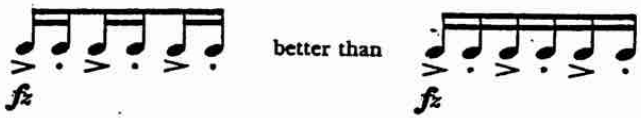
EXAMPLE 6 - 15

Broken beaming is not simply a convenient grouping of notes within the meter. It is also useful to point out the *end of a phrase* or the *beginning* of a new one. For this reason, the example at the left below —though not so academic as the one at the right—is actually preferable for its clarity. Broken beams are also helpful in calling attention to a *sudden change* of accent or dynamics (second line, below).




EXAMPLE 6 - 16

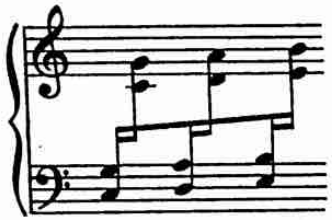
One might call such a momentary evasion of beaming principles "psychological beaming"; the evasion, in other words, is justified by increased reading facility and musical comprehension. In the example below, the normal pattern of six sixteenth-notes to the half-measure in $\frac{6}{8}$ is broken into three groups of two in order to dramatize the special inner accents.




EXAMPLE 6 - 17

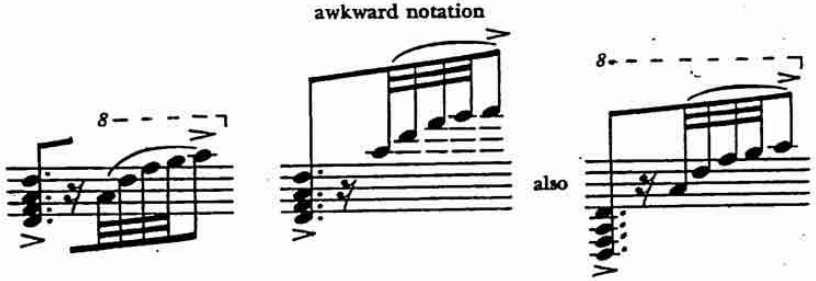
If this type of broken beaming occurs between the two staves of keyboard music, or in any other music notated on two staves, the beaming

pattern is usually as shown in Example 6-18. Here the interrupted secondary beams are positioned *below* the primary beam rather than above it. There is, however, no hard and fast rule governing this practice; therefore, secondary beams placed above the primary beam may sometimes be found in similar notational situations.



EXAMPLE 6-18

Even *primary beams* sometimes have to be broken for practical considerations—because there is insufficient space above or below the staff for writing the note-group (example at the left). Here, as we see, it would require too much space over the treble staff to put the primary beam above; nor should it be placed below, on account of the medium position of the chord on the staff. Moving the 8va sign to the left and then dropping the chord into the ledger-line basement is likewise an awkward notation.



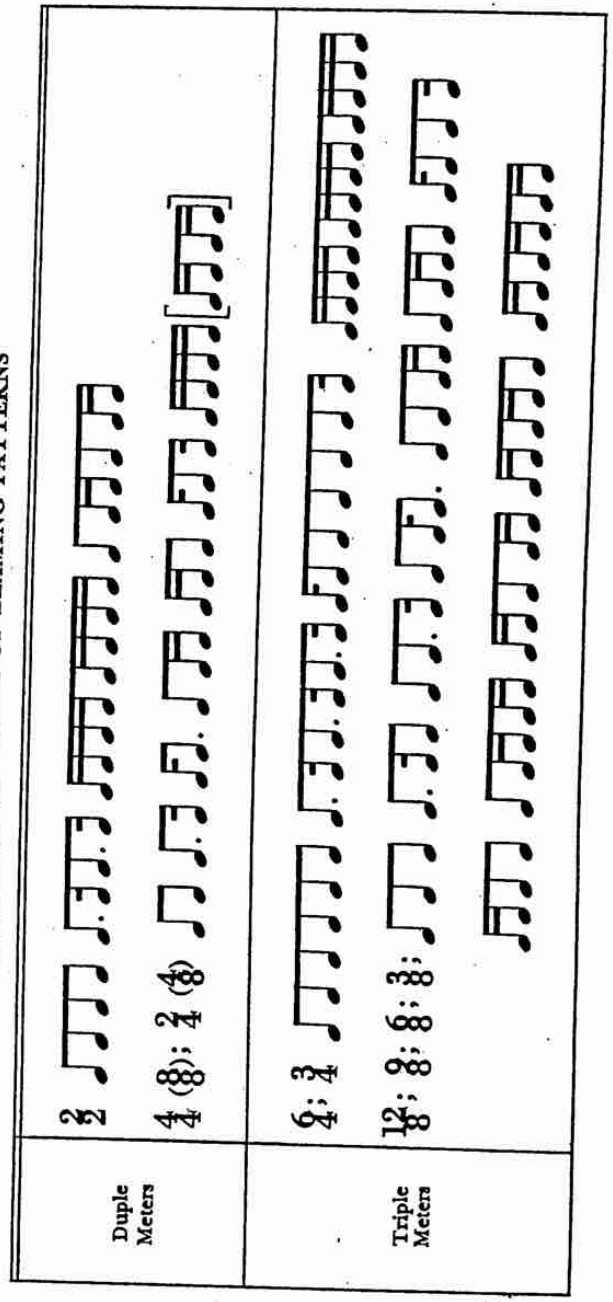

EXAMPLE 6-19

The only practical solution, then, in terms of space and proper use of the 8va sign, is to break the primary beam as shown in Example 6-19, at the left.

By now it is surely evident that the notator must approach his decisions with a flexible mind. In order that he may be flexible within the bounds of acceptable practice, we offer a Table of Beaming Patterns citing representative examples (by no means complete) of normal beaming patterns in the various common meters. (Example 6-20.)



EXAMPLE 6-20. TABLE OF BEAMING PATTERNS

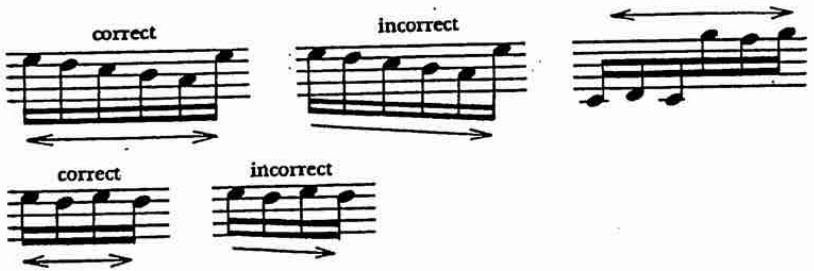


**4. Beaming Placement** The problem of placing flags and beams above or below the staff is solved by the same general principles that govern stem direction. If the majority of stems (marked in Example 6-21 with asterisks) normally go *up* in the group to be beamed, then all the stems will go *up* and the beams will be placed *above* the notes (example at the left). If, on the other hand, most of the notes require a *downward* stem (if most of the note-heads lie above the staff center), then the stems of all the notes must be written *down* and the beams placed *below* the note-heads (right-hand example).

EXAMPLE 6-21

The *direction* of all beams, whether confined to one staff or divided between two or more, should more or less parallel the main body of notes they connect. For the best visual effect the beams should, moreover, follow the *over-all contour* of the note-group, although there will be instances where space limitations will dictate otherwise. The eye must be the final judge, for the correct solution is the one that produces the clearest and neatest visual result (see Example 6-21).

For this reason, when beaming a figure that begins and ends at the same pitch level, the beam should be horizontal, and not slanted in the direction of the majority of the notes (examples on the top line). Short groups of alternating notes should also be beamed on the level instead of slanting from first to last (second line, below).

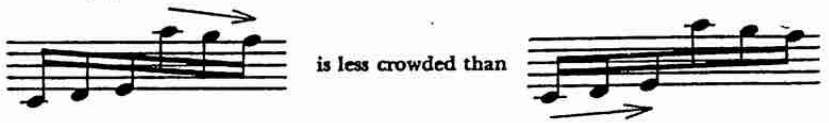



EXAMPLE 6-22

**5. Exceptional Beaming** Exceptional forms of beaming are sometimes necessary when there are very high and very low notes in a group to be beamed on one staff. When this problem occurs, it is

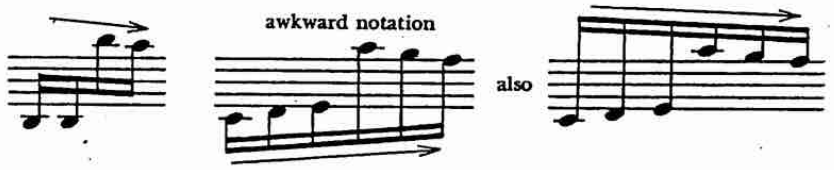


proper to place the beams *midway* between the note-groups, slanting in the general direction of one group of the note-heads. (See the right-hand illustration in the first line of Example 6-22 for an exception to this rule.)




EXAMPLE 6-23

The beaming shown in Example 6-23 is especially suitable for pointillistic music, in which notes constantly alternate between high and low. Even if the high and low notes are relatively static, it is best to slant the beams slightly for easier readability (left, below). The only alternative to this procedure would be to write the necessary beams *entirely* over or under the note-groups, which can often be exceedingly clumsy and space-consuming.



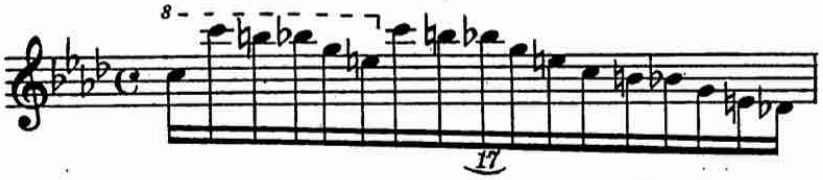

EXAMPLE 6-24

Even short groups containing only two or three notes can be beamed midway between the notes if the space between the staves is crowded.

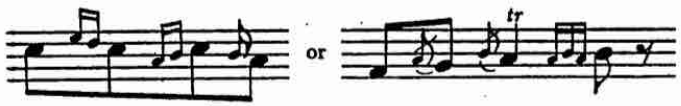
EXAMPLE 6-25

An expert notator quickly learns that many notational situations are in a sense exceptional, and salts his notational principles with a generous pinch of common sense. When, for instance, he encounters a *very large group* of notes of unequal number in relation to beat or measure, he beams them together. (See Example 6-26.)

When *grace notes* (single, or in groups) must be combined with normal beaming, he makes the picture clear by drawing the grace-note stems, flags, and beams in the direction opposite that of the regular notes, if it is logical or possible to do so, as in Example 6-27.



EXAMPLE 6 - 26. Frédéric Chopin: From *Impromptu*, Op. 29



EXAMPLE 6 - 27

And if beams are required on groups of *altered unisons* (see page 73), he will be able to devise some clear indication such as the following:

EXAMPLE 6 - 28

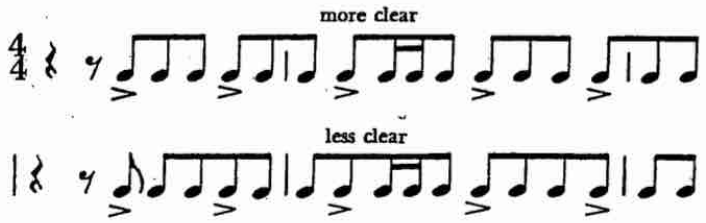
## MODERN INNOVATIONS

Among the many beaming practices transformed in twentieth-century notation the foremost is *beaming over barlines.* A primary cause for this phenomenon is the prevalence of syncopated rhythms, for consistent syncopation employing beamed notes is more logical and more graphic when the beaming is carried across the existing barlines.

EXAMPLE 6 - 29

Beaming over barlines also makes especially intelligible *ostinato*-like figures of equal metric length (although not necessarily of equal note-values) displaced in reference to normal recurrence of the beat. A version beamed over the barlines (example on the first line below) is easier to comprehend than one notated in a more traditional fashion (example on the bottom line).



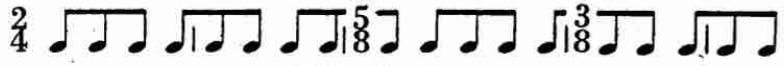



EXAMPLE 6 - 30

Sometimes a lengthy section, or even an entire movement of a work, will be notated with the beaming carried consistently over the barlines. Such an example may be found in Serge Prokofiev's *Classical Symphony*, the *Larghetto* movement, in which one section is beamed as follows:

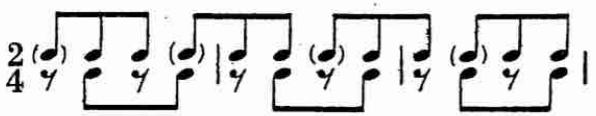
EXAMPLE 6 - 31

A consistent practitioner of such beaming habits, Igor Stravinsky in his early *Etude in F♯ major* for piano employed this same device for all but the last five measures. And in his *Chant du rossignol* (at No. 23), for another instance, he used the following pattern for a three-note *ostinato:*



EXAMPLE 6 - 32

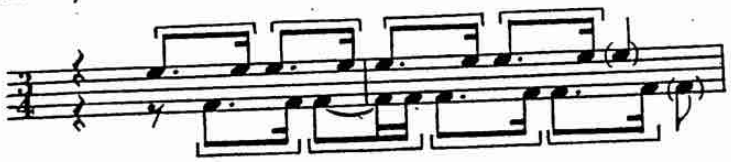
This type of beaming is essential when several metrical arrangements within a basic time-signature are used. In Aram Khachaturian's *Piano Concerto,* for example, the composer notated a $\frac{3}{8}$ pattern in a basic $\frac{2}{4}$ meter by a consistent beaming of the groups of three (last movement, measure 304 and following).



EXAMPLE 6 - 33

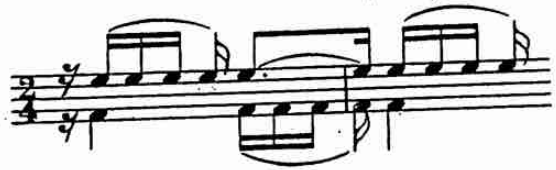
Irregular beaming over barlines is valid also when *rhythmic imitation* is involved between two or more voices or instrumental parts. The following pattern of irregular beaming was used by Arnold Schönberg

in his *Variations for Orchestra* (see measures 72–73) to show clearly the exact rhythmic imitation between two instrumental lines:



EXAMPLE 6-34

A similar kind of irregular beaming is illustrated in Béla Bartók's *String Quartet No. 3*. At one point in the coda (after No. 9) Bartók beamed two voices as follows:



EXAMPLE 6-35

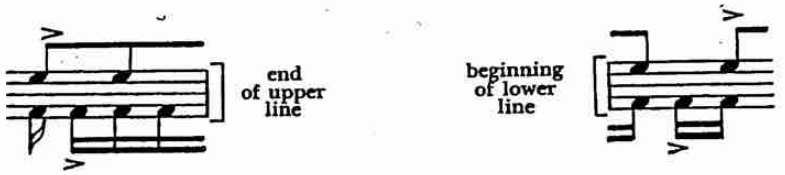
In the example above it will be noticed that the lower beam is not carried over the barline as one might expect. Possibly this was to clarify the distinction between the moving lower voices and the stationary upper part.

Sometimes a single beaming over the barlines may extend for several measures. This exceptional practice may be justified if the single long beam makes a rhythmic pattern more clear.

EXAMPLE 6-36

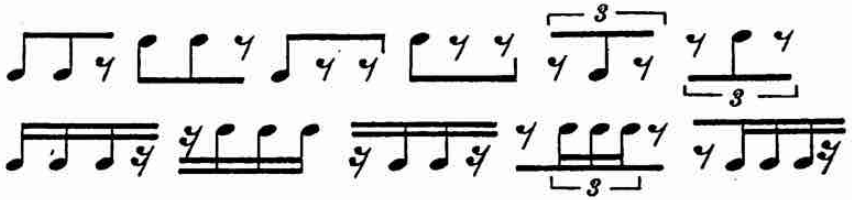
Beaming over the barlines frequently occurs at the end of a line or system, the interrupted beams continuing into the first measure of the next line or system. The practice in such cases is to continue the beams *beyond* the final note of the upper line, and to begin the next beams just *before* the first note of the lower line. In Example 6-37 the beams are shown as extended *to* the right-hand barline and *from* the left-hand barline. If the rhythmic pattern should compel the termination of a secondary beam, then only the primary beam would be extended in both measures.






EXAMPLE 6-37

Another modern beaming innovation involves the *inclusion of rests* at the beginning or at the end of a beamed figure. When such rest-symbols are a part of the beamed group, the beams are extended over or under the rests in the following ways:




EXAMPLE 6-38

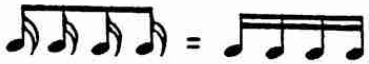
The practices above approximate the visual effect of all the notes being present within a beamed group. Once the eye has become accustomed to the sight of the extended beams, the sense and logic of such a practice will be apparent.

Sound practical sense has furthered the career of another innovation—the short, incomplete beams rather than flags for separate notes, used by many contemporary composers:

EXAMPLE 6-39

This practice has much to recommend it, as short beams are easier to read and draw than the traditional flags. If such a notation should in time become standard, it would be a reform to which no one could seriously object.

On the other hand, certain composers anxious to maintain an *avant-garde* status have invented notational devices that appear to have little justification beyond sheer novelty. Pierre Boulez, for example, in his *Le Marteau sans maître* combines flags and beams (left, below) instead of using four beamed sixteenth-notes (right).



EXAMPLE 6-40

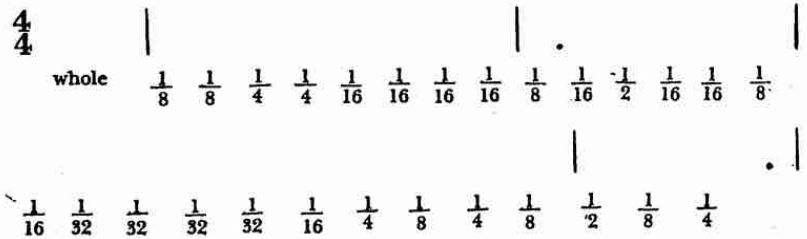
Except to initiates, the justification for this device is obscure; the new presentation seems to employ an unfamiliar symbol for one quite adequate *and* familiar. According to Erhard Karkoschka the device signifies that each note in the group is to be played in an independent, especially stressed manner. This may be true, yet Boulez himself nowhere offers an explanation as to what he really means and furthermore is inconsistent in the application of his invention. Modern notation needs amplification in its symbols, but the new forms must help, not hinder, the writing and reading of music.

A current beaming device that *does* make good visual sense is one found in many avant-garde works: *accelerandos* (left, below) and *ritardandos* (right, below) are expressed by beams that fan in or out—a highly graphic representation of rhythmic flexibility.

EXAMPLE 6-41

## NOTATION EXERCISES

1. Write the proper note-heads for the note pattern indicated below; draw stems, and place flags on each as needed. Note the dots indicated in measures 3 and 5:



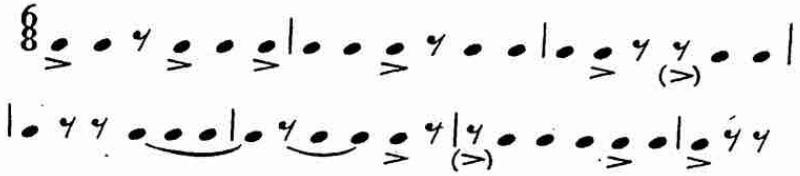

EXAMPLE 6-42

2. In the following example change the beaming direction as required:

EXAMPLE 6-43



3. In the example below, all note-heads represent eighth notes. Add stems; beam the groups according to the accents and slurs, and carry the beams over the rests in the modern manner:




EXAMPLE 6-44

4. Employing sixteenth-note *beams* rather than flags, notate a sequence of four altered unisons.

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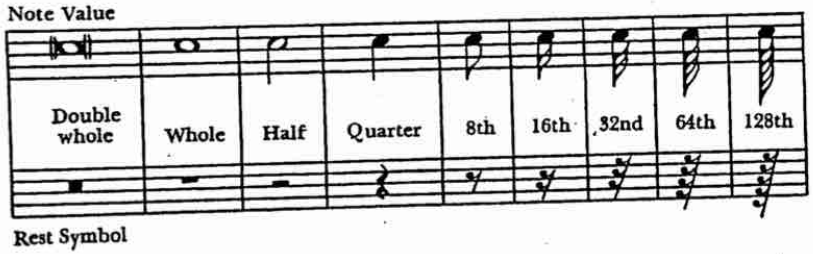
# 7

# Rests and Pauses

As MUSIC CONSISTS OF MEASURED SILENCE NO LESS than of sound, it was necessary to invent symbols to indicate the exact duration of such moments of rest (Fr. *soupir,* pl. *soupirs;* Ger. *Pause,* pl. *Pausen;* It. *pausa,* pl. *pause*). Each note-value, therefore, has its corresponding rest-sign.




EXAMPLE 7-1

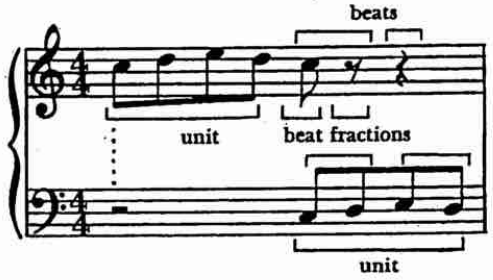
## RESTS

The written position of a rest between two barlines—like the position of a note—is determined by its location in the meter. In other words, a rest always occupies the same position in a measure that an equivalent note-value would fill—with one important exception that will be cited in the paragraph following Example 7-2.

Observe in Example 7-2 that the half rest is lined up directly under the *first* eighth-note of the four-note unit it equals. The quarter rest, too, is placed directly above the first eighth-note of the equivalent fourth count. The only exception to the rule of rest placement is the

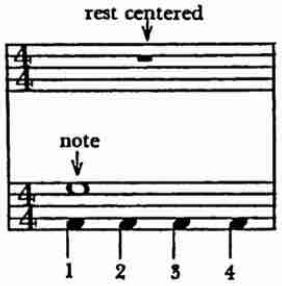






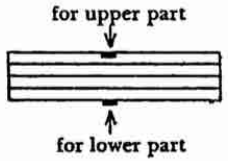

EXAMPLE 7-2

whole rest, which is always *centered* in the measure, whereas the whole note would of course occupy the written position of the first beat of the measure.




EXAMPLE 7-3

**The Whole Rest** The whole rest is a solid, oblong symbol the length of a note-head, placed just beneath the fourth line of the staff, regardless of the clef used. It is incorrect to place it elsewhere (beneath the third line, for instance) unless two voices or instruments share a common staff. When this happens, the whole rest is usually written beneath the *top* line for the upper part, and beneath the *bottom* line for the lower part. (See page 344 for further explanation.)




EXAMPLE 7-4

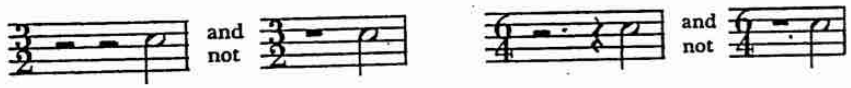
Although the whole rest literally signifies only the value of a whole note (or of two half-notes combined), it now commonly serves as the

symbol for any completely silent measure, regardless of the meter or time-signature (see Chapter 10). Formerly, it served for all measure values except $\frac{4}{2}$, this rest being indicated by a sign borrowed from the *breve* symbol of thirteenth- and fourteenth-century music (see page 15). But today the whole rest stands for any empty measure—for all meters from a theoretical $\frac{8}{2}$ to a $\frac{3}{16}$. For a $\frac{2}{16}$ $\left(\frac{1}{8}\right)$ or smaller silent bar, an actual eighth (or smaller ) rest would be used.

Conversely, as the whole rest is now used almost solely to represent an *entire* measure of rest, it must not ordinarily be employed for *less* than a measure. An exception to this rule could possibly occur in a $\frac{4}{2}$ or $\frac{8}{4}$ meter, where half of the measure length could be expressed by using a whole rest rather than two half-rests: $\frac{4}{2}$ 𝅝 𝅗𝅥 𝅗𝅥 . Conceivably, too, a whole rest could be used to express part of a measure in $\frac{3}{1}$ or $\frac{2}{1}$ meter, the 1 standing for the whole note as the beat, though such meters are quite rare.

EXAMPLE 7-5

With the above exceptions, a whole rest must not be used to indicate a fractional portion of a measure. This is particularly true in triple meters: $\frac{3}{2}$ or $\frac{6}{4}$. If two beats of a $\frac{3}{2}$ measure are to be silent, we must write two half-rests, rather than a whole rest. In compound triple meter $\left(\frac{6}{4}\right)$ we notate the rests equivalent to four quarter-notes as a dotted half-rest and a quarter rest, to indicate the natural division of the measure after the third quarter-note value.



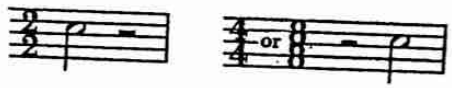

EXAMPLE 7-6

**The Half Rest** The half rest (so called because it has one-half the time-value of the whole rest) is an oblong mark of the same length as the whole rest, located *on* the third staff line. Again, it is incorrect to place this rest symbol on any other line unless two voices or instrumental parts share the staff. In this case, the half rest goes above the *top* line for the upper part, and above the *bottom* line for the lower part. (See page 368 for further discussion of this problem.)

Restrictions similar to those applied to the whole rest in triple meter also apply to the half rest. Although the half rest is equal to two quar-

EXAMPLE 7-7

ter-rests combined, it cannot always substitute for them. It is correct to write $\frac{3}{4}$ 𝄽 𝄽 𝅗𝅥 but not 𝄼 𝅗𝅥 ; or $\frac{3}{4}$ 𝅗𝅥 𝄽 𝄽 but not 𝅗𝅥 𝄼 . In other words, the half rest should be used to express two quarter-note values only when the measure is capable of being divided into two equal halves: $\frac{2}{2}$ or $\frac{4}{4}$ or $\frac{8}{8}$.




EXAMPLE 7-8

The principle of equal division of a duple measure is all-important, for it means that we cannot notate the following pattern in a simple duple meter: $\frac{2}{2}$ or $\frac{4}{4}$ 𝅗𝅥 𝄼 𝅗𝅥 . We must notate this pattern as: 𝅗𝅥 𝄽 𝄽 𝅗𝅥 , in spite of the fact that a syncopation, using notes instead of rests, would correctly be written 𝅗𝅥 𝅗𝅥 𝅗𝅥 .

**The Quarter Rest** Of all the rest symbols, the quarter rest is probably the most difficult to write or draw accurately. Hence a simplified form is sometimes found in music manuscripts, although it is not to be recommended. Another variant form appears in many older English editions, where the quarter rest is simply a reversed printing of the conventional eighth-rest: 𝄾 . This sign is actually the same as the "shorthand version," minus its bottom "hook."

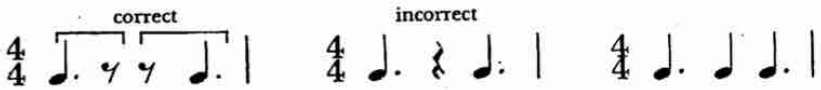
In its authoritative printed version the quarter rest may be examined in Example 7-1. Note that the sign is centered on the staff, with the top "tail" ending in the fourth space and the bottom "hook" resting in the first space.

As in the case of the whole and half rests, when two parts share a common staff, the quarter rest goes somewhat *above* the staff center for the upper part, and just *below* it for the lower part. The actual distance must depend on individual circumstances, especially on the amount of space available at the moment. When rules cannot operate normally, the eye—and common sense—must determine the most logical placement of all the rest signs. (See Example 7-9.)

In actual practice we have already discovered that the *choice* of rests depends only in part on the number of beats of rest; the notator must always consider the *normal division* of beats in the measure. For this sound reason, a quarter-rest sign cannot take the place of two eighth-

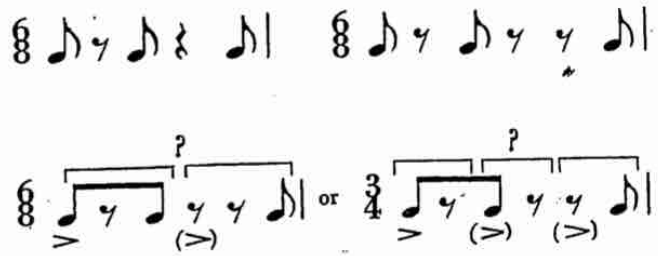
EXAMPLE 7-9

rests when by so doing it would obscure the normal organization of the measure. The correct notation at the left below cannot be properly written as demonstrated in the center. Though the second version is mathematically correct, only the first version clearly indicates the correct division of the measure. On the other hand, a consistently used syncopated rhythmic pattern—as shown at the right—is entirely correct in that notated form. (See the discussion of compound time-signatures in Chapter 10, and Example 10-15.)




EXAMPLE 7-10

In compound meters (see Chapter 10) the quarter rest is more informative than two eighth-rests because it indicates the unit of time at once. Thus in $\frac{6}{8}$ measure the left-hand notation below is more accurate than that directly following, because the latter version is ambiguous. We do not know from the two adjacent eighth-rests, taken out of context, which of the two readings on the bottom line is the correct interpretation of the pulse of the measure:

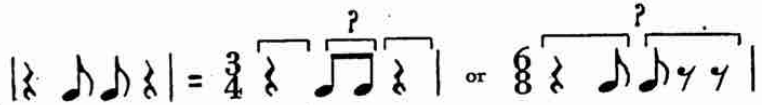



EXAMPLE 7-11

To give a further example, if we read the left-hand sequence of rests and notes below, we cannot immediately know whether the beat is triple ($\frac{3}{4}$) or compound duple ($\frac{6}{8}$). If the group is in triple time, the two eighth-notes should be beamed so as to show the proper beat unit

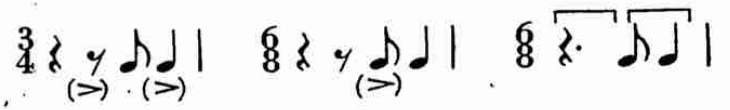


(as in the center example). If the pattern is in compound duple time, the last quarter-rest ought to be notated as two eighth-rests (as shown in the example at the right).




EXAMPLE 7-12

Again, standing by itself the following notation would be ambiguous: . This notation could be either $\frac{3}{4}$ or $\frac{6}{8}$ depending on the inner accent, as shown below. To avoid any ambiguity, $\frac{6}{8}$ measure should be used here and the quarter rest should be dotted, thus clearly indicating the required measure division.



EXAMPLE 7-13

**The Eighth Rest** The eighth rest, with half the value of the quarter rest, is written as a slanting stem with a single hook. Note in Example 7-1 that the stem rests on the *second staff line* and that the hook, ending in a thick dot, occupies the *third space*.

In some older music one sometimes finds the eighth rest written backward (identical with the English quarter-rest described in the previous section). Because these two signs are so easily confused, the archaic English form of the quarter rest has by now become obsolete.

**The Sixteenth Rest** Equal to half the value of the eighth rest, the 16th rest adds another hook to the slanting stem. As this second hook occupies the second staff space, the stem must be extended to touch the bottom line. (See Example 7-1.)

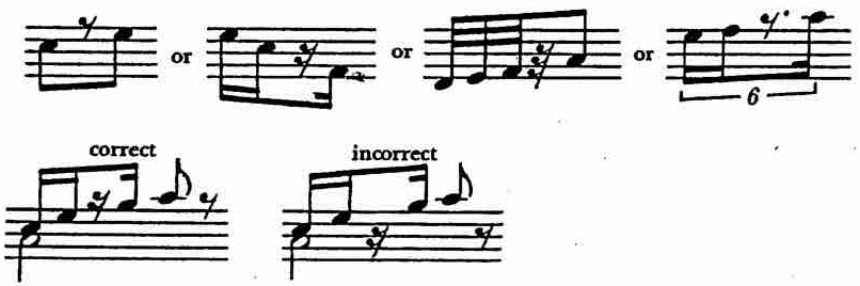
**The Thirty-second Rest** Half the value of the 16th rest, the 32nd rest consists of three hooks and a further extended stem. The three hooks now occupy the second, third, and fourth spaces, with the stem resting on the bottom line. This is a more logical arrangement than the form, found in some editions, with the stem extended below the staff; the sign is best contained where possible within the limits of the staff. (See Example 7-1.)

**The Sixty-fourth Rest** Though equal to just half the value of the 32nd rest, the 64th rest is an elaborate structure with its four hooks. Each hook must occupy one of the four staff spaces, and the slanting stem must accordingly be extended the distance of one space below the staff. (See Example 7-1.)

**The One Hundred Twenty-eighth Rest** Although it is very rare indeed, there *is* a 128th rest, equal to half the value of the 64th rest. It carries five hooks, the fifth one placed below the staff in the first added space, with the stem proportionately extended beneath it.

The Table of Rests on page 103, with the names of the rests in four principal languages, should be consulted as a parallel to the Table of Notes on page 65.

**Dotted Rests** With the possible exception of the 128th rest, all the rests may be dotted exactly as notes are dotted to increase their temporal length. A full treatment of this phase of rest usage is found on pages 119 and 120. Because of their peculiar written form, however, rests cannot be beamed as note-groups are beamed; but they can be included in beamed units, placed on the staff so as to occupy approximately the space that the corresponding note-heads would fill (examples on the top line). In the case of exceptional beaming—when the note stems and beams reverse their normal position—the rests should be positioned with the note-group of which they are a part (examples on the bottom line).




EXAMPLE 7-14

**Multiple Rests** Although a full score must of necessity include every silent measure, each usually filled in with a whole-rest sign, individual parts often use shorthand symbols to indicate the long rests. These symbols, evolved to conserve time and space, are shown in the Table of Multiple Rests on page 104.



EXAMPLE 7-15. TABLE OF RESTS

| Rest symbol | Terminology | | | | |
|---|---|---|---|---|---|
| | AMERICAN | BRITISH | FRENCH | GERMAN | ITALIAN |
| 𝄺 | Double whole-rest | Breve rest | Double-pause | Doppelganze Pause | Pausa di breve |
| 𝄻 | Whole rest | Semibreve rest | Pause | Ganze Pause | Pausa di semibreve |
| 𝄼 | Half rest | Minim rest | Demi-pause | Halbe Pause | Pausa di minima |
| 𝄽 | Quarter rest | Crochet rest | Soupir | Viertelpause | Pausa di semiminima |
| 𝄾 | Eighth rest | Quaver rest | Demi-soupir | Achtelpause | Pausa di croma |
| 𝄿 | Sixteenth rest | Semiquaver rest | Quart de soupir | Sechzehntelpause | Pausa di semicroma |
| 𝅀 | Thirty-second rest | Demisemiquaver rest | Huitième de soupir | Zweiunddreissigstel-pause | Pausa di biscroma |
| 𝅁 | Sixty-fourth rest | Hemidemisemiquaver rest | Seizième de soupir | Vierundsechzigstel-pause | Pausa di semibiscroma |
| 𝅂 | One hundred and twenty-eighth rest | Semihemidemisemi-quaver rest | Trente et deuxième de soupir | Hundert und achtund-zwanzigstelpause | Pausa di cento-ventottavo |

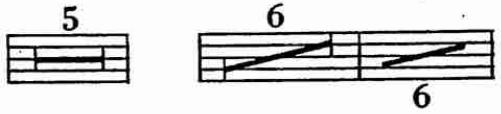
**EXAMPLE 7-16. TABLE OF MULTIPLE RESTS**

| | | |
|---|---|---|
| 1 measure | | whole rest under fourth line |
| 2 measures | | double whole-rest in third space |
| 3 measures | | two-measure rest plus whole rest |
| 4 measures | | two double whole-rests joined as one in second and third spaces |
| 5 measures | | four-measure rest plus whole rest |
| 6 measures | | four-measure rest plus two-measure rest |
| 7 measures | | four-measure rest plus two-measure rest plus whole rest |
| 8 measures | | two four-measure rests |
| 9 measures and longer | | thick horizontal bar on third line with vertical ends plus large numeral above or below staff |



The symbol for a two-measure rest was logically borrowed from the medieval sign for two whole-notes—the *brevis* (or *breve*). (See page 15.) For measures of rest from three to eight, the signs are extensions and combinations of the double whole-rest and single whole-rest symbols.

Although this system is logical and accurate, it is a bit "fussy." The practice now is to employ, from the two-measure rest on, a single heavy bar, either horizontal or slantwise on the staff. This is terminated by short vertical bars, with the figure indicating the number of measures of rest centered above or below the staff. Note that the bar, when horizontal, is placed normally on the center line (left, below). When a slanting line is used, one end rests on the second line, the other on the fourth line. The bar is always slanted upward from left to right, whether with or without short perpendicular "ends" (right, below).

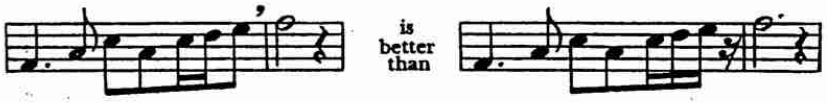



**EXAMPLE 7-17**

## PAUSES

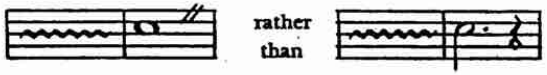
Written rests, of whatever duration, are always given a time-value: that is, the rest symbols merely substitute for a written note-value. But there is one type of rest that has no specific time-value, and that is the *pauses* (Fr. *pauses;* Ger. *Luftpausen;* It. *pause*). Pauses are indicated in various ways: 𝄒 or // or 𝄐.

The comma indicates a very brief pause, equivalent to taking a short breath. This sign is sometimes preferable to a very small rest, for it ensures that the note it follows will not be cut too short, but will receive full value.




**EXAMPLE 7-18**

The two small slanting lines—always placed through the *top space* of the staff—are used at the end of long phrases or sections, where a desired pause is not adapted to an actual written rest.



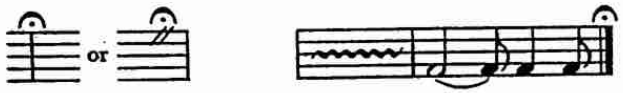

**EXAMPLE 7-19**

Placing a *fermata* sign (see section below) above the slanting symbol prolongs the pause. It is generally used following a long note-value, which thereby maintains its full duration.

## FERMATAS

Fermatas (𝄐) or holds (Fr. *pauses;* Ger. *Fermaten;* It. *fermate* or *pause*)—first used in polyphonic music of the sixteenth century—are signs for indicating a prolonged sound or silence of indefinite time-value. The exact length of a fermata depends in large measure on the general tempo and emotional character of the music. In a quick tempo the fermata tends to be relatively brief; in a moderate to slow tempo the pause would be correspondingly longer. The important point is that all normal pulsation stops during the fermata.

Placed over a single barline or over a pause sign (left, below) the fermata means that all sound should stop briefly before the music resumes in the following measure. Unless otherwise indicated by a *ritardando* or similar direction, the previous tempo is resumed following the fermata. When placed over a double bar, the fermata signifies the end of a section, movement, or an entire work. It is usually not necessary over a final double-bar, as the double bar in itself fulfills the same function. Only if the final measure should end on the last part of the concluding beat would the fermata over the double bar be justified (right, below).



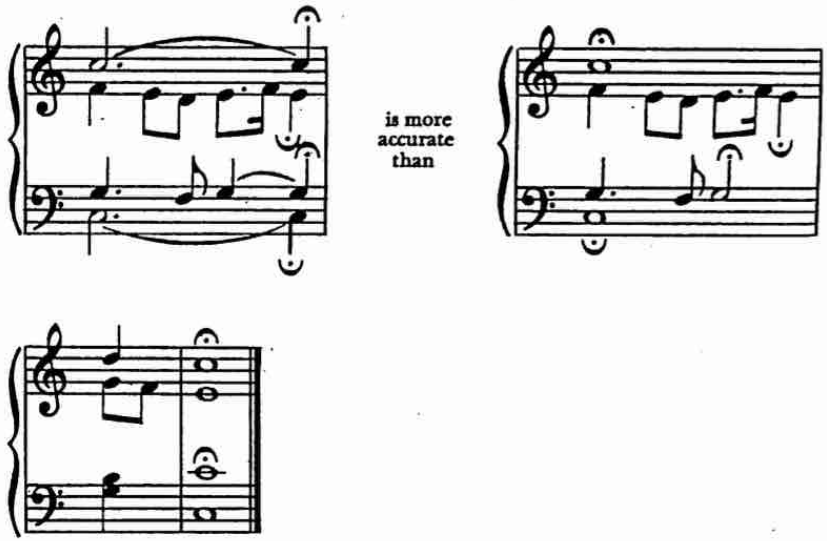

EXAMPLE 7 - 20

Fermatas are sometimes accompanied by the terms *lunga,* meaning "long," or *poco,* meaning "little" or short. Over a silent measure the fermata sign means a prolonged pause for all voices or instruments. The same effect is sometimes indicated as ***G.P.*** (from the German *Grosse Pause,* or "long pause") or as ***L.P.*** (abbreviation for the Italian *lunga pausa*).

EXAMPLE 7 - 21

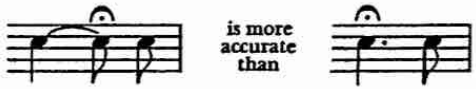


The fermata sign should always be placed over the *exact beat* of the measure that is to be prolonged. This is especially important when a number of voices or parts are involved, each concluding its phrase on a different portion of the measure. In the following example at the left it is the fourth beat *only* that is held for all parts, so that putting a fermata on other beats in other parts is both inaccurate and clumsy. Note that the fermata sign is inverted when placed beneath a note or rest. If, however, all voices or parts terminate together on the beat to be prolonged, only one fermata sign is necessary over each staff, regardless of the number of notes or the number of staves in use (second line, below).




EXAMPLE 7 - 22

When there is a "pick-up" note immediately following a fermata, it is better to put the hold-sign over the first half (or fraction) of the beat, tied from a previous note, than to write the held value as a dotted note.



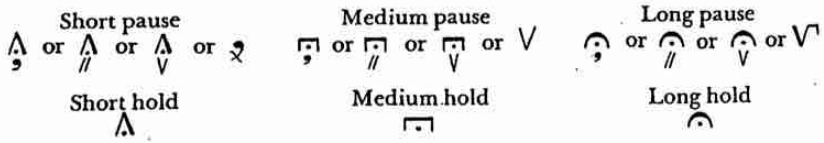

EXAMPLE 7 - 23

The terms *fermata* and *tenuto* are sometimes equated in meaning by amateurs. These are not identical terms, even though *tenuto* implies a prolonged note. (We find the first use of the term in the vocal music of the ninth century. It was abbreviated as ***b.t.*** in plainsong manuscripts, standing for the Latin *bene tene,* "hold well.") In modern practice, *tenuto* is more a matter of stress than of stopping, with notes or chords sustained for their full value. It is generally indicated by the dash, the historic sign for a pressure accent (see Chapter 15).

## MODERN INNOVATIONS

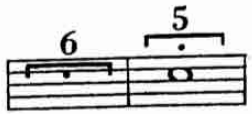
Oddly enough, the most significant contribution of contemporary notation in the field of rests is the omission of rest-signs altogether in *tacet* measures. Today a blank measure is one that is silent—a practice especially time-saving in the preparation of full orchestral and band scores. A modification of this practice is to fill in with the whole-rest sign the silent measures of only those instruments or voices that do play or sing on the page in question. If the part is *tacet* for the entire page, no rests are put in the blank measures.

Certain modern composers have also devised ingenious alterations of the fermata sign to signify degrees of pause (first examples shown below), and of holds (lower examples).




**EXAMPLE 7 - 24**

Squared fermata symbols accompanied by figures have been used by other contemporary composers to designate pauses or holds of specified time-duration. In the following, for example, the pause is to last six seconds; the note thereafter is to be held for five seconds.



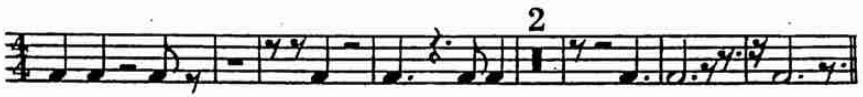

**EXAMPLE 7 - 25**

Innovations such as these fermata symbols are clear and precise as to their meaning. When new notational signs of comparable clarity become available, the composer or notator should not hesitate to abandon the ambiguous symbols of the past for something better.



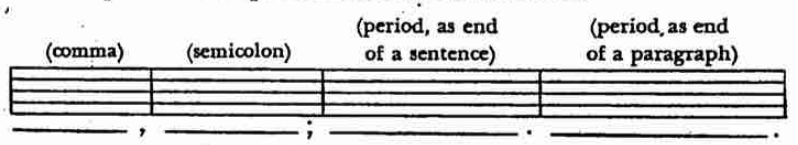
## NOTATION EXERCISES

1. In the following example re-notate all the rests, placing them in the proper positions and changing their values where necessary:




**EXAMPLE 7 - 26**

2. At the end of each measure below place the appropriate pause-sign to correspond to the punctuation mark indicated:




**EXAMPLE 7 - 27**

3. Using the modern forms of the *pause* shown in Example 7-24, notate an original melody for flute.

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ber of inner pulsations. The denominator, on the other hand, in simple time indicates the *unit of time,* or note-value, that receives one beat (for compound time, refer to the discussion just below). If the half note, therefore, is to be the unit of simple time, it is expressed by the figure 2 in the denominator; if a quarter note, by the figure 4; if an eighth note, by the figure 8, and so on.

## PERFECT AND IMPERFECT TIME

From the time signature the performer also knows immediately whether he is reading *perfect* or *imperfect* time, for the numerator will indicate whether the measure can be divided into equal halves or thirds. If the numerator is exactly divisible by two or three, we have *perfect time.* Duple or quadruple time can be divided exactly into halves, triple time into thirds; therefore these are perfect time. *Imperfect time* includes all meters not equally divisible by two or three; quintuple and septuple meters, for instance, are called imperfect because five and seven cannot be divided equally into either halves or thirds.

Perfect time (both duple and triple) is further classified as *simple* and *compound.* In simple time each beat of the measure is subdivided only in units of two or its multiples. For example: $\frac{4}{4}$ measure is *perfect* time because the number of beats (four) is exactly divisible by *two.* It is *simple* time because a quarter note receives one beat, and any subdivision will be at the ratio of two eighth-notes to a beat; four sixteenth-notes to a beat, and so on—all divisible by two.

In *compound time* the beats of the measure are subdivided not by two but by *three.* For example: $\frac{12}{8}$ is *perfect* time, because the measure can be divided into exact halves; but it is also *compound* quadruple time because it is performed with four beats per measure, each beat being subdivided into three eighth-notes (or their equivalent).

Because we have no single figure-symbol that indicates the true denominator in compound time, common practice is to use the note-values of simple time: quarter notes, eighth notes, sixteenth notes, and so on. In actuality, the denominator is a unit made by combining *three* such values, expressed in notation by a dotted note: *i.e.,* $\frac{6}{8} = \text{♩.♩.}$.

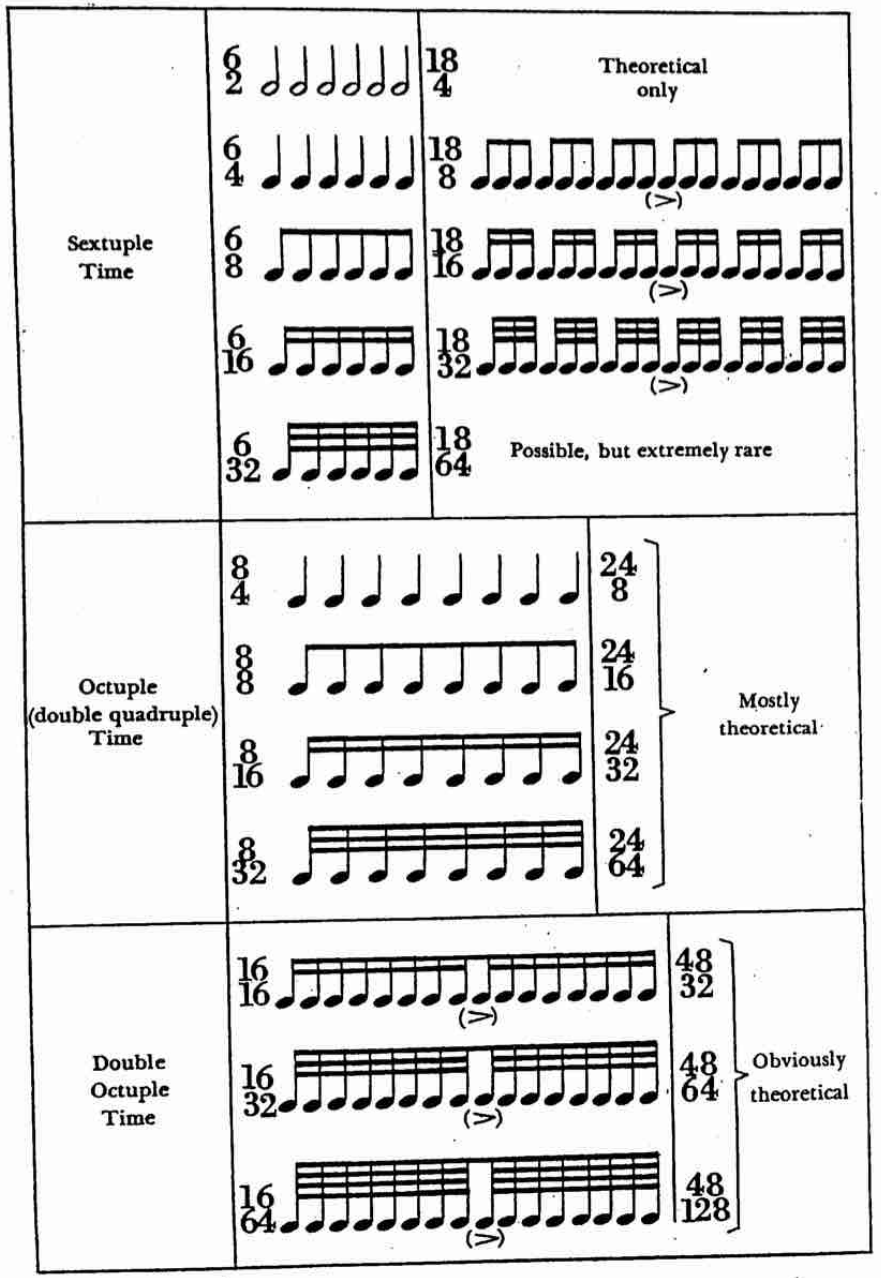
The Table of Time Signatures gives all the time signatures possible under each heading—perfect and imperfect. Some are fairly common in practice, some very rare.

Two familiar time-signatures do not appear in the Table. One is the sign used to represent $\frac{4}{4}$ (simple quadruple) time and erroneously

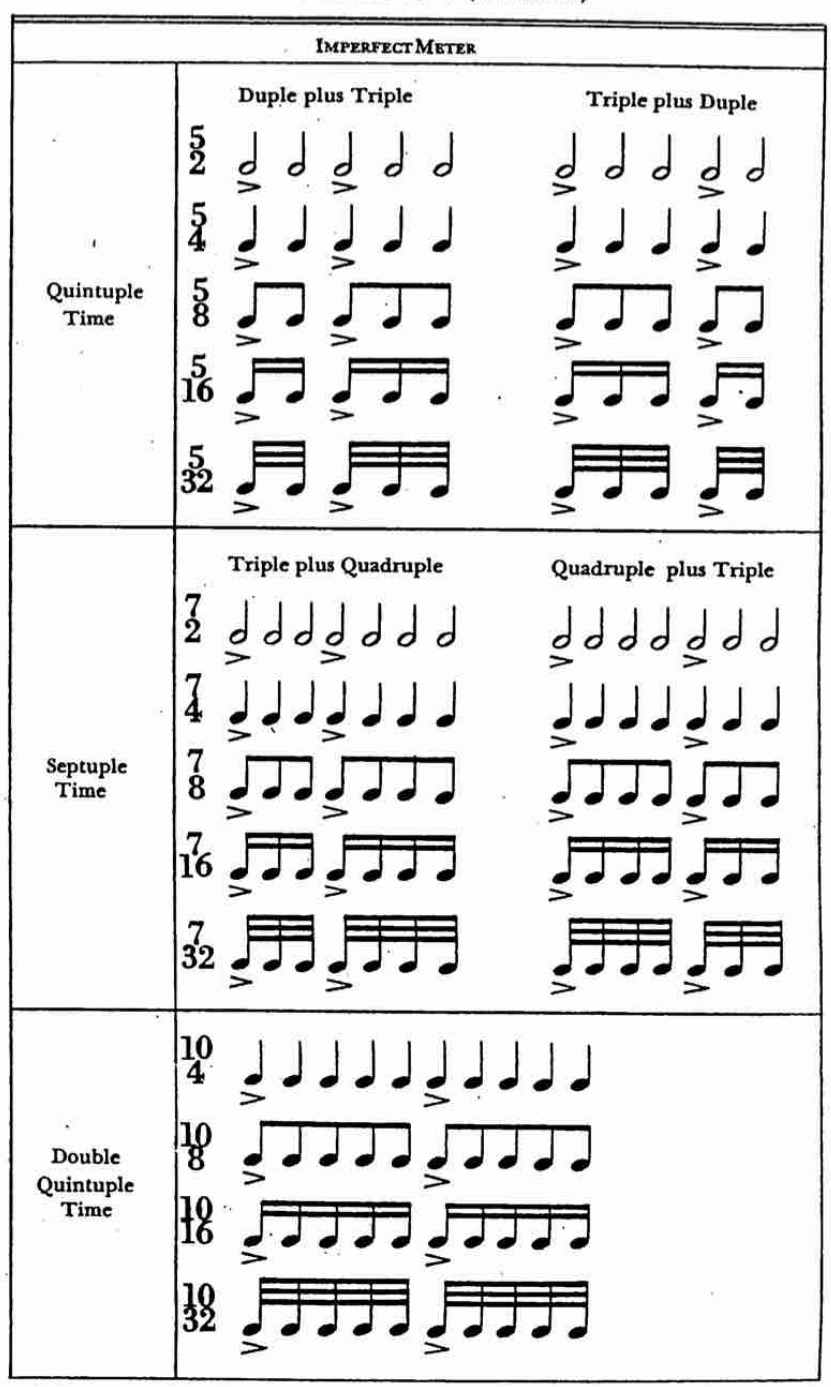
**EXAMPLE 10-4: TABLE OF TIME SIGNATURES**

| | Perfect Meter | |
|---|---|---|
| | Simple (units divisible by 2) | Compound (units divisible by 3) |
| Duple Time | $\frac{2}{1}$ $\frac{2}{2}$ $\frac{2}{4}$ $\frac{2}{8}$ $\frac{2}{16}$ | $\frac{6}{2}$ $\frac{6}{4}$ $\frac{6}{8}$ $\frac{6}{16}$ $\frac{6}{32}$ |
| Triple Time | $\frac{3}{1}$ $\frac{3}{2}$ $\frac{3}{4}$ $\frac{3}{8}$ $\frac{3}{16}$ | $\frac{9}{2}$ $\frac{9}{4}$ $\frac{9}{8}$ $\frac{9}{16}$ $\frac{9}{32}$ |
| Quadruple (double duple) Time | $\frac{4}{2}$ $\frac{4}{4}$ $\frac{4}{8}$ $\frac{4}{16}$ | $\frac{12}{4}$ $\frac{12}{8}$ $\frac{12}{16}$ $\frac{12}{32}$ |

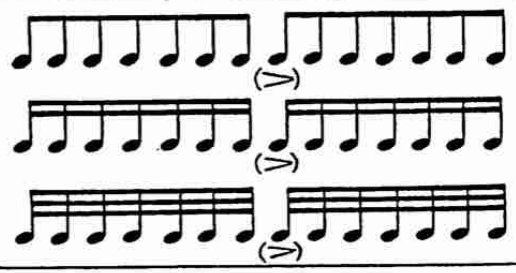
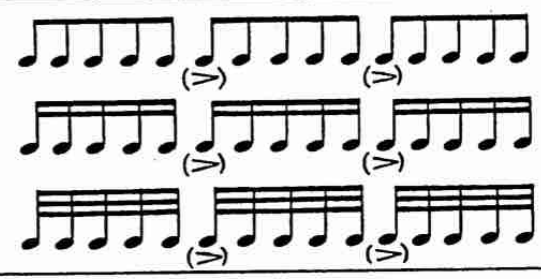
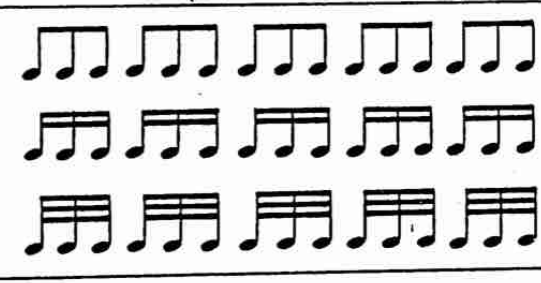
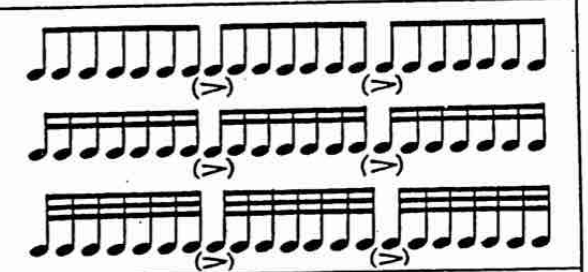
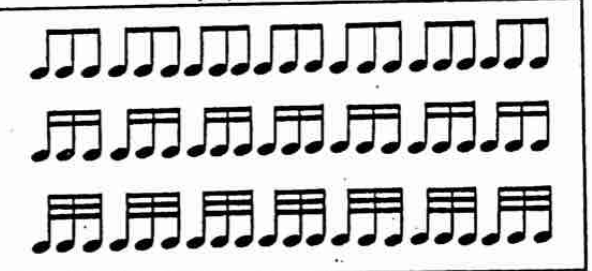
EXAMPLE 10 - 4 (continued)



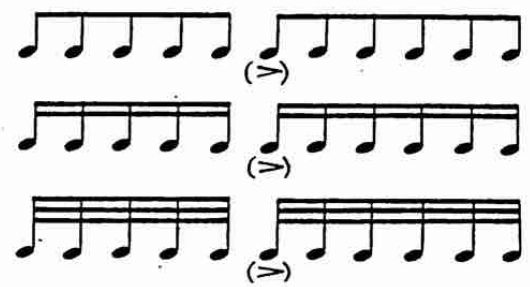
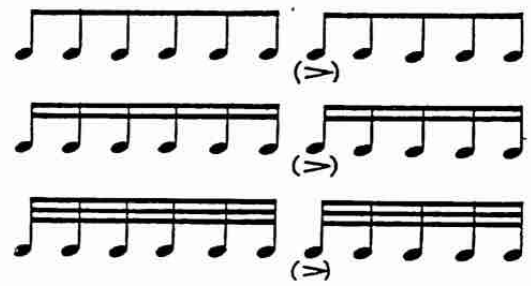

EXAMPLE 10 - 4 (continued)



EXAMPLE 10 - 4 (continued)

| | |
|---|---|
| Double Septuple Time |  |
| Triple Quintuple Time |  |
| Quintuple Triple Time |  |
| Triple Septuple Time |  |
| Septuple Triple Time |  |

EXAMPLE 10 - 4 (continued)

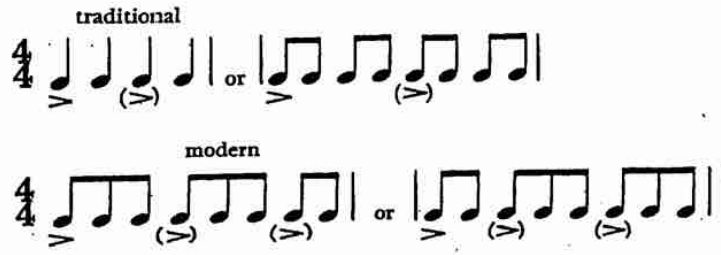
| Combined Meters | |
|---|---|
| Quintuple plus Sextuple Time |  |
| Sextuple plus Quintuple Time |  |
| Quintuple plus Octuple Time | |
| Octuple plus Quintuple Time | |

termed "common time" because the C is popularly considered an abbreviation of "common." The other sign is ¢, used to indicate $\frac{2}{2}$ (simple duple) meter, misinterpreted as the abbreviation for "cut time." Both definitions result from delusions. Their proper history is as follows:

During the Middle Ages, notational development was in the hands of the monks, who inevitably associated religious and musical phenomena. To them the three-part concept of the Holy Trinity represented religious perfection; therefore to them only triple meter was perfect meter. To express this meter they placed the geometrically perfect circle ◯ (called in Latin a *perfectum*) at the beginning of the plainchant. A compound triple meter ($\frac{9}{4}$ or $\frac{9}{8}$ in modern notation) was indicated by placing a dot within the circle: ⊙. Representing thrice three, this sign no doubt stood for the ultimate in *triplicum* rhythm!

These church musicians considered all metrical pulsation in two or four *imperfect*. Thus their notation of twos and fours was simplicity itself—a broken or incomplete circle, C (*imperfectum* in Latin). As a broken circle is practically indistinguishable from the hand-written letter C, the notation of the imperfect meters came to resemble the letter C more than the broken circle.

Beyond being the object of popular misconceptions, the sign C is ambiguous at best, for it has been used at times to designate $\frac{4}{2}$ and $\frac{8}{8}$ as well as $\frac{4}{4}$. Perhaps it should be discarded as having outlived its usefulness, especially as even $\frac{4}{4}$ does not always mean today what it did in the past. In older music $\frac{4}{4}$ (or C) invariably meant four quarter-notes to the measure, equally subdivided into eighth notes (upper line of Example 10-5). Today, $\frac{4}{4}$ might well mean the patterns indicated at the bottom of this example—to give but two current modifications. (See also Example 10-16.)




EXAMPLE 10-5

As for the symbol ¢—the imperfect circle bisected by a perpendicular line represents a literal halving of the sign for quadruple



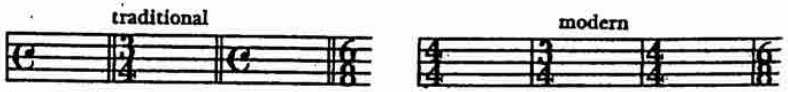
meter, and is used for $\frac{2}{2}$ meter, properly termed *alla breve*. $\frac{2}{2}$ is half of $\frac{4}{4}$ in the number of *beats* per measure, although there is the same number of quarter notes in each meter. Again, the symbol seems inadequate for the inner complexity of modern metric pulsation, and perhaps should also be scrapped in favor of more precise time-signatures.

## TRADITIONAL PRACTICES

Expert notational practice for meter must be based fundamentally on the concept that meters *change*. Sometimes the change is a simple matter of inner organization of the measure. For whereas quadruple and octuple time are both extensions of simple duple meter, and sextuple time is basically multiplied triple meter—all the *imperfect* meters are capable of several inner patterns. That is to say, quintuple time may be a combination of 3 + 2, or of 2 + 3, or 4 + 1; septuple time may be 4 + 3, 3 + 4, or further broken down into units of 2 + 2 + 3, or 3 + 2 + 2. Double quintuple time is capable of expressing not only 5 + 5, but such subdivisions as 3 + 2 + 2 + 3, or 2 + 3 + 3 + 2—all of which add up to 10 units per measure. The combined meters (5 + 6, or 7 + 6, for example) are all capable of even further fragmentation.

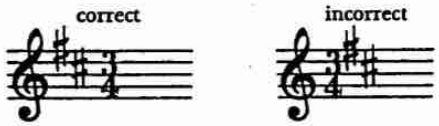
Such metrical complexity—common to the music of all but the most conservative composers of today—will be discussed in detail in the Modern Innovations portion of this chapter. (See Table of Compound Meters, page 169.) But in many cases the notator, with no tool other than correct *beaming* (see Chapter 6), can indicate to the performer the inherent character of these complex patterns.

When, however, there is a change in the *consistent pattern* of the beat groups from one measure to another, it should be indicated by a change in time signature. For example: *one,* two, three; *one,* two, three, four; *one,* two, three—would be expressed as $\frac{3}{4}$; $\frac{4}{4}$; $\frac{3}{4}$. Formerly it was the custom to put a double bar before each meter change. But with the almost constant change of time signature in a large proportion of present-day music, such a practice is tedious and unnecessary. Time-signature changes now are usually prefaced by the single barline only.




EXAMPLE 10-6

Observe one important point: whereas *clef* changes should be indicated *before* the barline, *time signatures* should always be placed *after* the barline (see also page 184). When key signatures are also involved, the meter sign is put *after* the accidentals, not before them.




EXAMPLE 10 - 7

When meters (and hence, time signatures) change from perfect *simple* to perfect *compound* time, or vice versa, though the basic unit (or beat) remains the same—the two equal notes of the basic unit are sometimes placed within parentheses just above the new time-signature. The left-hand example below indicates that the eighth note is constant; that is, the $\frac{6}{8}$ measure is not played as two triplets in $\frac{2}{4}$ time, but as six full eighth-notes, each of exactly the same duration as the individual eighth-notes in the $\frac{2}{4}$ measure. A performer studying such a notation might first count the passages below as: *one,* two, three, four; *one,* two, three, four, five, six; and *one,* two three, four, five, six; *one,* two three, four—all at a constant speed. For in the right-hand example the quarter notes of the $\frac{2}{2}$ measure are played at the same speed as those of the $\frac{6}{4}$ measure.

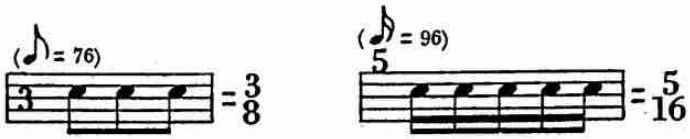
EXAMPLE 10 - 8

## MODERN INNOVATIONS

To read contemporary music—to write it, play it, or even listen to it—a musician must first understand the technical elements that set it apart from the historic past. Of these elements, modern rhythmic notation is supremely important.

**1. Unusual Time-Signatures** A practice so general among twentieth-century composers that it may be safely imitated is the use of written time-signatures that consist only of the *numerator*—notated as a large figure centered on or over the staff. The omitted denominator, or beat unit, must be supplied by the performer, but it should be immediately obvious. There is only one possible denominator—given the numerator and the written notes of any complete measure.






EXAMPLE 10 - 9

Another intriguing aspect of contemporary rhythmic notation is its exploitation of the *smaller units*—16th notes and 32nd notes— instead of the customary half- , quarter- , and eighth-notes. Of the legion of contemporary works employing the shorter time-units as meter signatures, only a handful can be listed below:

$\frac{2}{32}$
Karlheinz Stockhausen: *Zeitmasse*

$\frac{3}{32}$
Bo Nilsson: *Mädchentotenlieder;* Karlheinz Stockhausen: *Zeitmasse;* Anton Webern: *String Quartet,* Op. 28

$\frac{5}{32}$
Karlheinz Stockhausen: *Zeitmasse*

$\frac{7}{32}$
Bo Nilsson: *Mädchentotenlieder;* Karlheinz Stockhausen: *Zeitmasse*

$\frac{8}{32}$
Karlheinz Stockhausen: *Zeitmasse*

$\frac{21}{32}$
Elliott Carter: *'Cello Sonata*

$\frac{1}{16}$
Giselher Klebe: *Moments musicaux;* Olivier Messiaen: *Oiseaux exotiques;* Bo Nilsson: *Mädchentotenlieder;* Karlheinz Stockhausen: *Gruppen; Zeitmasse*

$\frac{2}{16}$
Karlheinz Stockhausen: *Zeitmasse;* Igor Stravinsky: *Le Sacre du printemps; Symphony in C*

$\frac{3}{16}$
Olivier Messiaen: *Oiseaux exotiques;* Bo Nilsson: *Mädchentotenlieder;* Karlheinz Stockhausen: *Gruppen; Zeitmasse;* Igor Stravinsky: *"Dumbarton Oaks" Concerto; Le Sacre du printemps; L'Histoire du soldat; Movements for Piano and Orchestra; Symphony in C;* Anton Webern: *String Quartet,* Op. 28; *String Trio*

$\frac{5}{16}$
Luciano Berio: *Serenata I;* Benjamin Britten: *War Requiem;* Leon Kirchner: *Duo for Violin and Piano;* Olivier Messiaen: *Trois petites liturgies;* Henri Pousseur: *Symphonies à 15 Solistes;* Silvestre Revueltas: *Planos;* Karlheinz Stockhausen: *Gruppen; Zeitmasse;* Igor Stravinsky: *Agon; Canticum sacrum; Capriccio for Piano and Orchestra; "Dumbarton Oaks" Concerto; Le Sacre du printemps; L'Histoire du soldat; Movements for Piano and Orchestra; Symphony in C;* Anton Webern: *String Trio*

$\frac{6}{16}$
Benjamin Britten: *Nocturne;* Leoš Janáček: *Mladi;* Henri Pousseur: *Symphonies à 15 Solistes;* Arnold Schönberg: *Variations for Orchestra;* Igor Stravinsky: *Symphony in C*

7/16
Leonard Bernstein: *Serenade for Solo Violin, String Orchestra, Harp and Percussion;* Pierre Boulez: *Improvisation sur Mallarmé,* No. 1; Olivier Messiaen: *Trois petites liturgies;* Henri Pousseur: *Symphonies à 15 Solistes;* Silvestre Revueltas: *Sensemayá;* Roger Sessions: *Duo for Violin and Piano;* Karlheinz Stockhausen: *Gruppen;* Igor Stravinsky: *Agon; Canticum sacrum; "Dumbarton Oaks" Concerto; L'Histoire du soldat; Movements for Piano and Orchestra; Symphony in C*

8/16
Pierre Boulez: *Improvisation sur Mallarmé,* No. 1; Karlheinz Stockhausen: *Zeitmasse;* Igor Stravinsky: *Canticum sacrum; L'Histoire du soldat*

9/16
Luciano Berio: *Serenata I;* Pierre Boulez: *Improvisation sur Mallarmé,* No. 1; Roy Harris: *Concerto for Piano, Clarinet, and String Quartet;* Leon Kirchner: *Duo for Violin and Piano;* Henri Pousseur: *Symphonies à 15 Solistes;* Arnold Schönberg: *Variations for Orchestra;* Karlheinz Stockhausen: *Gruppen;* Igor Stravinsky: *"Dumbarton Oaks" Concerto; Movements for Piano and Orchestra*

10/16
Pierre Boulez: *Improvisation sur Mallarmé,* No. 1; Elliott Carter: *8 Etudes and a Fantasy; String Quartet No. 1; String Quartet No. 2;* Roy Harris: *Concerto for Piano, Clarinet, and String Quartet;* Igor Stravinsky: *Movements for Piano and Orchestra*

11/16
Leon Kirchner: *Duo for Violin and Piano; String Quartet No. 1;* Roger Sessions: *Piano Sonata No. 2;* Karlheinz Stockhausen: *Zeitmasse;* Igor Stravinsky: *"Dumbarton Oaks" Concerto*

12/16
Alban Berg: *Lyric Suite;* Elliott Carter: *String Quartet No. 1; String Quartet No. 2;* Roy Harris: *Concerto for Piano, Clarinet, and String Quartet;* Leon Kirchner: *String Quartet No. 1;* Roger Sessions: *Piano Sonata No. 2;* Igor Stravinsky: *Movements for Piano and Orchestra*

13/16
Alan Hovhaness: *October Mountain;* Leon Kirchner: *String Quartet No. 1;* Roger Sessions: *Piano Sonata No. 2*

14/16
Elliott Carter: *8 Etudes and a Fantasy; String Quartet No. 1; String Quartet No. 2;* Roy Harris: *Concerto for Piano, Clarinet, and String Quartet;* Igor Stravinsky: *Movements for Piano and Orchestra*

15/16
Elliott Carter: *String Quartet No. 1; String Quartet No. 2;* Roy Harris: *Concerto for Piano, Clarinet, and String Quartet;* Charles Ives: *Robert Browning Overture;* Leon Kirchner: *String Quartet No. 1*

16/16
Roy Harris: *Concerto for Piano, Clarinet, and String Quartet;* Karlheinz Stockhausen: *Zeitmasse*

17/16
Roy Harris: *Concerto for Piano, Clarinet, and String Quartet;* Alan Hovhaness: *October Mountain;* Leoš Janáček: *Mladi*

18/16
Arnold Schönberg: *Five Piano Pieces,* Op. 23



By no means, of course, are such time-signatures exclusive with the twentieth century. Precedent goes back to J. S. Bach—the *Gigue* of the sixth *English Suite,* for instance, has a signature of 12/16; *Prelude No. 15* in *The Well-tempered Clavier* is prefaced by a signature of 24/16. Beethoven's *Piano Sonata,* Op. 111 has a signature of 12/32 for one movement. But these are exceptional meters in the music of the eighteenth and nineteenth centuries; they are much more frequently found in contemporary music, as the foregoing list well illustrates.

At the opposite extreme of the scale of note values we find the *larger units*—the whole note or even the double whole-note—occasionally used as a basic unit of time. Historically, this also is not a brand-new practice. The celebrated piano pedagogue Muzio Clementi employed the time signature of 3/1 (the 1 standing for a whole note) in one piece from the *Gradus ad Parnassum;* the same signature was used by Camille Saint-Saëns in the final movement of his *Symphony No. 3,* and by Nicolai Rimsky-Korsakov in his *Russian Easter Overture.* Alexander Borodin wrote the *Scherzo* movement of his *Symphony No. 2* in 1/1 (four very fast quarter-notes—but only one beat—in each measure). But a good many composers in our own time have used whole or half notes as time signatures, as demonstrated below:

1/1
Pierre Boulez: *Improvisation sur Mallarmé,* No. 2

2/1
Pierre Boulez: *Improvisation sur Mallarmé,* No. 2; Arnold Schönberg: *Five Piano Pieces,* Op. 23

3/1
Carl Orff: *Carmina Burana*

4/1
Pierre Boulez: *Improvisation sur Mallarmé,* No. 2

5/1
Pierre Boulez: *Improvisation sur Mallarmé,* No. 2

8/1
Pierre Boulez: *Improvisation sur Mallarmé,* No. 2; Carl Orff: *Carmina Burana*

1/2
Pierre Boulez: *Le Marteau sans maître;* Benjamin Britten: *Cantata Academica; War Requiem;* Luigi Dallapiccola: *Il Prigioniero;* Paul Hindemith: *Der Schwanendreher;* Carl Orff: *Carmina Burana;* Arnold Schönberg: *Chamber Symphony; String Trio;* Karlheinz Stockhausen: *Zeitmasse;* Anton Webern: *Quartet,* Op. 22

5/2*
Samuel Barber: *Adagio for Strings;* Pierre Boulez: *Improvisation sur Mallarmé,* No. 2; Henry Cowell: *Suite for Violin and Piano; Symphony No. 15;* Luigi Dallapiccola: *Volo di notte;* Carl Orff: *Carmina Burana*

6/2
Samuel Barber: *Adagio for Strings;* Benjamin Britten: *Gloriana;* Paul

* 2/2, 3/2, and 4/2 are too common to justify inclusion here.

Hindemith: *Kammermusik No. 4;* Carl Orff: *Carmina Burana*

$\frac{8}{2}$

Carl Orff: *Carmina Burana*

$\frac{7}{2}$

Henry Cowell: *Suite for Violin and Piano;* Carl Orff: *Carmina Burana;* Anton Webern: *Cantata No. 1*

$\frac{12}{2}$

Roy Harris: *Concerto for Piano, Clarinet, and String Quartet*

In other unusual time-signatures we observe a reversal of the foregoing practices. That is, while the units of time (the denominators) are standard quarter- and eighth-notes, there are many beats per measure (large numerators). A generous sampling of meters from $\frac{7}{4}$ to $\frac{21}{8}$ is shown here:

$\frac{7}{4}$

Béla Bartók: *String Quartet No. 5; The Miraculous Mandarin;* Leonard Bernstein: *The Age of Anxiety;* Benjamin Britten: *War Requiem;* Paul Hindemith: *Symphonia Serena;* Charles Ives: *Violin Sonata No. 2;* Carl Orff: *Carmina Burana;* Arnold Schönberg: *Variations for Orchestra;* Roger Sessions: *Duo for Violin and Piano;* Igor Stravinsky: *Agon*

$\frac{8}{4}$

Béla Bartók: *String Quartet No. 5; The Miraculous Mandarin;* Charles Ives: *Violin Sonata No. 2;* Ernst Krenek: *String Quartet No. 7;* Bo Nilsson: *Ein irrender Sohn;* Arnold Schönberg: *Moses und Aron;* Igor Stravinsky: *Agon*

$\frac{9}{4}$

Samuel Barber: *Cello Sonata;* Béla Bartók: *The Miraculous Mandarin;* Leonard Bernstein: *Suite from "On the Waterfront";* Arthur Honegger: *Le Roi David;* Charles Ives: *Violin Sonata No. 2;* Ernst Krenek: *String Quartet No. 7;* Bo Nilsson: *Ein irrender Sohn;* Carl Orff: *Catulli Carmina;* Arnold Schönberg: *Violin Concerto;* Igor Stravinsky: *Agon*

$\frac{10}{4}$

Lukas Foss: *Time Cycle;* Alan Hovhaness: *Mysterious Mountain;* Ernst Krenek: *String Quartet No. 7;* Bo Nilsson: *Ein irrender Sohn*

$\frac{11}{4}$

Lukas Foss: *Time Cycle;* Nicolai Rimsky-Korsakov: *The Snow Maiden;* Igor Stravinsky: *Le Sacre du printemps*

$\frac{12}{4}$

Luigi Dallapiccola: *6 Carmina Alcaei;* Lukas Foss: *Time Cycle;* Arthur Honegger: *Le Roi David;* Ernst Krenek: *String Quartet No. 7;* William Walton: *Belshazzar's Feast; Violin Concerto*

$\frac{10}{8}$

Béla Bartók: *Music for Strings, Percussion, and Celesta; String Quartet No. 5;* Aaron Copland: *Violin Sonata;* Roy Harris: *Trio;* Paul Hindemith: *When Lilacs Last in the Dooryard Bloom'd;* Olivier Messiaen: *Les Offrandes oubliées;* Igor Stravinsky: *Threni*

$\frac{11}{8}$

Béla Bartók: *Music for Strings, Percussion, and Celesta;* Roy Harris: *Symphony No. 7;* Paul Hindemith: *Symphonia Serena;* André Jolivet: *Concerto pour ondes Martenot;* Leon Kirchner: *String Quartet No. 1;* Olivier Messiaen: *Les Offrandes oubliées*



$\frac{13}{8}$

Leoš Janáček: *Sinfonietta*

$\frac{14}{8}$

Elliott Carter: *8 Etudes and a Fantasy*

$\frac{15}{8}$

Elliott Carter: *String Quartet No. 2;* Claude Debussy: *Fêtes; Rondes de printemps; String Quartet;* Paul Hindemith: *When Lilacs Last in the Dooryard Bloom'd*

$\frac{18}{8}$

Samuel Barber: *Cello Sonata;* Charles Martin Loeffler: *2 Rhapsodies;* Ottorino Respighi: *Vetrate di chiesa*

$\frac{19}{8}$

John Vincent: *Consort for Piano and Strings*

$\frac{20}{8}$

Igor Stravinsky: *Threni*

$\frac{21}{8}$

Elliott Carter: *String Quartet No. 1*

Conversely, the quarter note and the eighth note have been used as denominators with exceedingly small numerators—such as $\frac{1}{4}$, $\frac{1}{8}$, and $\frac{2}{8}$. A few representative examples follow:

$\frac{1}{4}$

Pierre Boulez: *Improvisation sur Mallarmé,* No. 1 and No. 2; *Le Marteau sans maître;* Aaron Copland: *Short Symphony;* Luigi Dallapiccola: *6 Carmina Alcaei;* Leoš Janáček: *Sinfonietta;* Olivier Messiaen: *Les Offrandes oubliées;* Bo Nilsson: *Mädchentotenlieder;* Luigi Nono: *Incontri;* Carl Orff: *Carmina Burana; Catulli Carmina;* Silvestre Revueltas: *Planos;* Karlheinz Stockhausen: *Gruppen;* Igor Stravinsky: *Symphony in Three Movements;* Edgard Varèse: *Intégrales; Octandre*

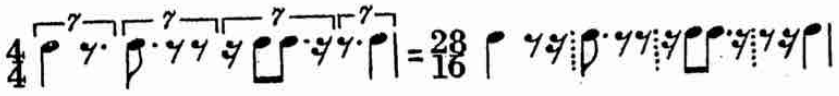
$\frac{1}{8}$

Pierre Boulez: *Le Marteau sans maître;* Howard Hanson: *String Quartet;* Leoš Janáček: *Sinfonietta;* Silvestre Revueltas: *Planos;* Karlheinz Stockhausen: *Gruppen; Zeitmasse;* Igor Stravinsky: *Concerto in D for Violin and Orchestra; Le Sacre du printemps;* Anton Webern: *String Trio*

$\frac{2}{8}$

Béla Bartók: *Piano Concerto No. 2; String Quartet No. 3;* Alban Berg: *Chamber Concerto;* Luciano Berio: *Serenata I;* Luigi Dallapiccola: *Volo di notte;* Olivier Messiaen: *Oiseaux exotiques; Trois petites liturgies;* Carl Orff: *Carmina Burana;* Silvestre Revueltas: *Pianos;* George Rochberg: *Symphony No. 1;* Arnold Schönberg: *Five Piano Pieces,* Op. 23; *Violin Concerto;* Karlheinz Stockhausen: *Gruppen; Zeitmasse;* Igor Stravinsky: *Le Sacre du printemps; Movements for Piano and Orchestra; Symphony in C; Threni;* William Walton: *Symphony No. 1;* Anton Webern: *Cantata No. 1; String Quartet,* Op. 28; *String Trio*

Still other contemporary composers refrain from tinkering with either the numerators or the denominators of conventional signatures; instead, they indicate their unusual meters *directly over* the note-patterns on the staff. An excellent example of this practice is supplied by Nono's *Varianti* for orchestra. Here this contemporary Italian composer wished to employ a measure-pattern of 28 sixteenth-notes, for which a correct time-signature would be $\frac{28}{16}$. But since he thought of this measure in four equal divisions of seven notes each, he chose to write a conventional $\frac{4}{4}$ signature, and then to indicate the four groups of seven by the figures directly above them. His procedure, if compared with the other possible notation in $\frac{28}{16}$, is infinitely simpler and clearer.



EXAMPLE 10 - 10

**2. Alternating Meters** Regular alternating time-signatures such as $\frac{6}{8}$ $\frac{4}{4}$ $\frac{6}{8}$ $\frac{4}{4}$ are sometimes conveniently notated by means of a *double time-signature* placed at the beginning of the movement or passage: $\frac{6}{8} + \frac{4}{4}$. This would indicate that each pair of measures would follow this pattern of alternating meters unless otherwise indicated, thus avoiding repetitious notation of regularly recurring changes. This practice has been confirmed by successful use in such works as the following:

$\frac{2}{2} + \frac{3}{2}$—Aaron Copland: *Sextet for Clarinet and Strings*

$\frac{2}{2} + \frac{3}{4}$—Leonard Bernstein: *Suite from "On the Waterfront"*

$\frac{6}{4} + \frac{4}{4}$—Franz Liszt: *A Faust Symphony;* Richard Strauss: *Der Rosenkavalier*

$\frac{5}{4} + \frac{4}{4}$—Wolfgang Fortner: *Symphony*

$\frac{4}{4} + \frac{5}{4}$—Gunther Schuller: *Contours for Small Orchestra*

$\frac{4}{4} + \frac{3}{4}$—Leonard Bernstein: *Serenade; Suite from "On the Waterfront"; The Age of Anxiety;* Aaron Copland: *Violin Sonata*

$\frac{4}{4} + \frac{2}{4}$—Wallingford Riegger: *Symphony No. 4*

$\frac{3}{4} + \frac{4}{4}$—Richard Strauss: *Der Rosenkavalier*

$\frac{3}{4} + \frac{2}{4}$—Aaron Copland: *Suite from "The Red Pony"*

$\frac{3}{4} + \frac{3}{8}$—Leonard Bernstein: *Serenade;* Aaron Copland: *Short Symphony*



$\frac{2}{4} + \frac{3}{4}$—Richard Strauss: *Don Quixote*

$\frac{2}{4} + \frac{6}{8}$—Leonard Bernstein: *"Jeremiah" Symphony;* Richard Strauss: *Der Rosenkavalier*

$\frac{2}{4} + \frac{3}{8}$—Leonard Bernstein: *The Age of Anxiety;* Aaron Copland: *Short Symphony*

$\frac{9}{8} + \frac{6}{8}$—Miklos Rozsa: *Violin Concerto*

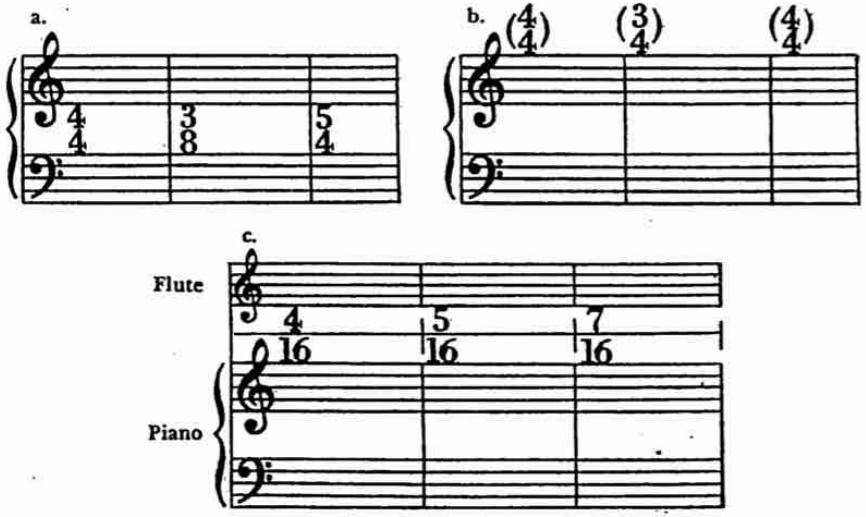
$\frac{6}{8} + \frac{5}{8}$—Aaron Copland: *Sextet for Clarinet and Strings; Short Symphony*

$\frac{6}{8} + \frac{4}{8}$—Albert Roussel: *Petite Suite*

$\frac{3}{8} + \frac{2}{4}$—Aaron Copland: *Third Symphony*

$\frac{3}{8} + \frac{4}{8}$—Gustav Mahler: *Symphony No. 6*

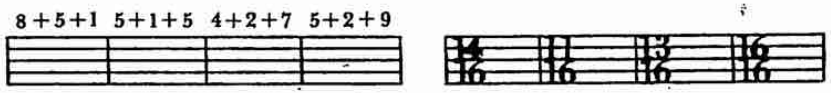
**3. Variable Meters** Variable meters occur when almost every measure needs a new time-signature but when there is no consistent pattern of recurrent meters: $\frac{4}{4}$ $\frac{3}{4}$ $\frac{5}{4}$ $\frac{3}{8}$ $\frac{4}{4}$ and so on. Some composers in writing variable meters have placed a *single large signature* between the two staves of a keyboard piece, rather than a separate signature on each staff (Example 10-11a). In Claude Debussy's *Préludes pour piano* the composer has written the meter changes directly above the staff, enclosed in parentheses (Example 10-11b). Boulez in his *Sonatine* for flute and piano has put the changing meters on a single line between the flute and piano staves (Example 10-11c).




EXAMPLE 10 - 11

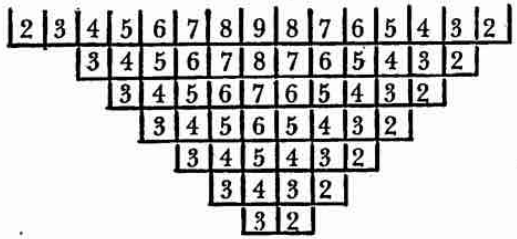
Claude Ballif in his *Voyage de mon oreille* (impeccable title!) for orchestra devised a related method of avoiding topheavy numerators.

He simply indicated a *metronome mark,* giving the note-unit (a sixteenth note), but dispensed with any traditional time-signature. Instead, figures are placed *directly over* the staff for each measure to show the number and division of the units within each pair of barlines. Comparison will demonstrate that a more conventional notation is not necessarily more clear:




EXAMPLE 10-12

It makes little difference, actually, just where these time signatures are placed as long as they are clearly shown. The German composer Boris Blacher solved this problem in his *Orchester-Ornament* by inscribing on the first page of the conductor's score: "In 8ths." For the numerators of his varying meters he then provided a separate line, writing the number of beats above each measure: 2 |5 |9 |7 |6 |4.
This work, incidentally, was the first to illustrate Blacher's theory that variable meters should follow a very definite pattern. As a concrete example, the first three score pages followed this pattern of variable meters:



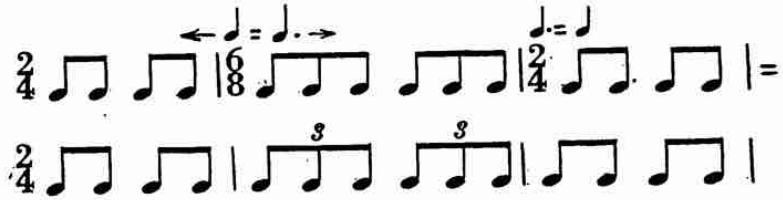

The balance of the work was built on similarly elaborate patterns of the eight figures, in every possible permutation.

**4. Combined Meters** Combined time-signatures are used in a piece of music to indicate one of two conditions: either a *fixed pattern* of changing meters (such as we have already discussed under Alternating Meters) or a *flexible alternation* of simple and compound meters containing the same number of rhythmic units. A combined signature of $\frac{6}{8}$ $(\frac{3}{4})$ or of $\frac{3}{4}$ $(\frac{6}{8})$ would mean that the measures alternate —freely or strictly—between the simple meter $(\frac{3}{4})$ and the compound meter $(\frac{6}{8})$. (See examples in the left-hand column on page 168.)



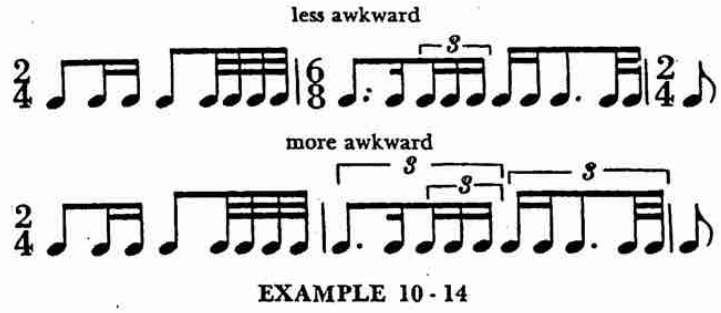
Performers beginning their study of works in these combined meters will do well to remember that the *note-values are constant;* only the major stresses change. The first reading of a $\frac{6}{8}$ $(\frac{3}{4})$ meter is best counted throughout as six exactly equal eighth-notes to a measure; the first reading of the $\frac{6}{4} = \frac{3}{2}$ is best counted throughout as six quarter-notes to a measure. Then, with the constant note-value established, the position of the varying stresses may be indicated.

A different type of combined signature marks the shift from triplet measures notated $\frac{3}{8}$, $\frac{6}{8}$, $\frac{9}{8}$, or $\frac{12}{8}$ changing to $\frac{2}{4}$, $\frac{3}{4}$, or $\frac{4}{4}$—in cases where the three eighth-notes (or dotted quarter) of the triplet measures are to have the same time-span as the quarter note of the simple-time measure. We could notate this combined meter as $\frac{2}{4}$ $(\frac{6}{8})$ or $\frac{2}{4} = \frac{6}{8}$.




EXAMPLE 10-13

Examples of this type of combined meter may be seen in the right-hand column on page 168.
The combined meter is especially adapted to notating complex patterns that would be cumbersome in a constant $\frac{2}{4}$. But the wary performer will keep firmly in mind that when this $\frac{2}{4}$ becomes $\frac{6}{8}$, there are still *two* beats to a measure, of exactly the same length, whatever the signature; that there are *three* beats in every measure of $\frac{3}{4}$ $(\frac{9}{8})$; and *four* beats in every measure of $\frac{4}{4}$ $(\frac{12}{8})$. Still more complicated alternations become simple to the performer who remembers that in all cases the quarter-note beat of the simple measure equals the three-eighth-note beat of the compound measure (see Example 10-14).




EXAMPLE 10-14

Combined meters may be studied in such works as:

$\frac{3}{2} = \frac{6}{4}$ or $\frac{6}{4} = \frac{3}{2}$ — Luigi Dallapiccola: *Il Prigioniero;* Claude Debussy: *La Cathédrale engloutie;* Alberto Ginastera: *Variaciones Concertantes;* Charles Ives: *Violin Sonata No. 2;* Arnold Schönberg: *Moses und Aron*

$\frac{3}{4} = \frac{6}{8}$ or $\frac{6}{8} = \frac{3}{4}$ — Aaron Copland: *El Salón México;* Alberto Ginastera: *Pampeana No. 3*

$\frac{4}{2} = \frac{12}{4}$ — Alban Berg: *3 Orchestra Pieces*

$\frac{3}{2} = \frac{9}{4}$ — Paul Hindemith: *When Lilacs Last in the Dooryard Bloom'd*

$\frac{2}{2} = \frac{6}{4}$ — Luigi Dallapiccola: *Il Prigioniero*

$\frac{4}{4} = \frac{12}{8}$ or $\frac{12}{8} = \frac{4}{4}$ — Arthur Honegger: *Jeanne d'Arc au bûcher;* Goffredo Petrassi: *Partita for Orchestra*

$\frac{9}{8} = \frac{3}{4}$ or $\frac{3}{4} = \frac{9}{8}$ — Igor Stravinsky: *Concerto in D for String Orchestra*

$\frac{2}{4} = \frac{6}{8}$ — Maurice Ravel: *Une Barque sur l'océan*

$\frac{2}{4} = \frac{12}{16}$ or $\frac{12}{16} = \frac{2}{4}$ — Leonard Bernstein: *The Age of Anxiety;* Claude Debussy: *Collines d' Anacapri;* Peter Racine Fricker: *Symphony No. 1*

$\frac{3}{8} = \frac{9}{16}$ — Easley Blackwood: *Symphony No. 2*

**5. Compound Meters** Compound time-signatures * point out that within the measures there will be *unorthodox groups* of the basic units of time (the beats). We have previously viewed these unorthodox groups as beaming problems (see Chapter 6) because correct beaming makes them accessible. To review—in the examples below we see the eight eighth-notes of a $\frac{4}{4}$ measure first in conventional groups and then in unorthodox groups with a compound signature.

conventional groupings — unorthodox grouping

EXAMPLE 10-15

Any traditional pattern in any meter may of course be altered to a compound meter, the only limit being the mathematical law of permutation. The Table of Compound Meters lists most of the feasible possibilities in measures from $\frac{4}{8}$ to $\frac{12}{8}$.

* Compound *time-signatures* and compound *time* (see page 150) must be considered completely different terms.



EXAMPLE 10-16. TABLE OF COMPOUND METERS

| Meter | Compound | | Meter | Compound | | Meter | Compound | |
|---|---|---|---|---|---|---|---|---|
| 4/8 (2/4) | 1+3/8 | 1+2+1/8 | 8/8 (Cont.) | 1+4+3/8 | 5+3/8 | 11/8 | 2+3+2+4/8 | 5+2+2+2/8 |
| | 3+1/8 | 2+1+1/8 | | 2+1+5/8 | 6+2/8 | | 2+3+4+2/8 | 2+3+6/8 |
| | 1+1+2/8 | | | 2+5+1/8 | | | 2+3+3+3/8 | 2+6+3/8 |
| 5/8 | 1+1+3/8 | 3+1+1/8 | 9/8 | 1+2+6/8 | 3+5+1/8 | | 3+2+2+4/8 | 3+3+5/8 |
| | 1+2+2/8 | 2+3/8 | | 1+6+2/8 | 3+2+4/8 | | 3+2+4+2/8 | 3+5+3/8 |
| | 2+1+2/8 | 3+2/8 | | 1+3+5/8 | 3+4+2/8 | | 3+2+3+3/8 | 3+4+4/8 |
| | 2+2+1/8 | | | 1+5+3/8 | 4+1+4/8 | | 4+2+2+3/8 | 3+6+2/8 |
| 6/8 (3/4) | 1+2+3/8 | 2+3+1/8 | | 1+4+4/8 | 4+4+1/8 | | 4+2+3+2/8 | 4+2+5/8 |
| | 1+3+2/8 | 3+1+2/8 | | 2+1+6/8 | 5+1+3/8 | | 4+3+2+2/8 | 4+5+2/8 |
| | 2+1+3/8 | 3+2+1/8 | | 2+6+1/8 | 5+3+1/8 | | 4+3+4/8 | 5+3+3/8 |
| 7/8 | 1+2+4/8 | 3+1+3/8 | | 2+2+5/8 | 5+2+2/8 | | 4+4+3/8 | 6+2+3/8 |
| | 1+4+2/8 | 3+3+1/8 | | 2+5+2/8 | 2+7/8 | | 5+2+4/8 | 6+3+2/8 |
| | 1+3+3/8 | 3+2+2/8 | | 2+3+4/8 | 4+5/8 | | 5+4+2/8 | 7+2+2/8 |
| | 2+1+4/8 | 2+5/8 | | 2+4+3/8 | 5+4/8 | 12/8 (6/4) | 2+3+7/8 | 3+5+4/8 |
| | 2+4+1/8 | 3+4/8 | | 3+1+5/8 | 7+2/8 | | 2+7+3/8 | 4+3+5/8 |
| | 2+2+3/8 | 4+3/8 | 10/8 (5/4) | 2+2+3+3/8 | 2+5+3/8 | | 2+4+6/8 | 4+5+3/8 |
| | 2+3+2/8 | 5+2/8 | | 2+3+2+3/8 | 3+2+5/8 | | 2+6+4/8 | 5+2+5/8 |
| 8/8 (4/4) | 1+2+5/8 | 2+3+3/8 | | 2+3+3+2/8 | 3+5+2/8 | | 2+5+5/8 | 5+5+2/8 |
| | 1+5+2/8 | 3+2+3/8 | | 3+2+2+3/8 | 3+3+4/8 | | 2+8+2/8 | 5+3+4/8 |
| | 1+3+4/8 | 3+5/8 | | 3+2+3+2/8 | 3+4+3/8 | | 3+2+7/8 | 5+4+3/8 |
| | | | | 3+3+2+2/8 | 4+3+3/8 | | 3+7+2/8 | 7+2+3/8 |
| | | | | 2+2+6/8 | 5+2+3/8 | | 3+4+5/8 | 7+3+2/8 |
| | | | | 2+6+2/8 | 5+3+2/8 | | | |
| | | | | 2+3+5/8 | 6+2+2/8 | | | |

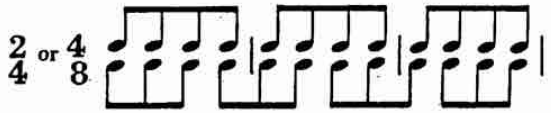
The Table of Compound Meters works just as well with smaller beat-units such as 16th and 32nd notes. Stockhausen's *Zeitmasse,* for instance, employs $\frac{1+6+2}{16}$. And in Boulez' *Improvisation sur Mallarmé,* No. 1 we find:

$$\frac{4+6}{16},\ \frac{2+3+2}{16},\ \text{and}\ \frac{3+2+3}{16}.$$

6. **Polymeters (simultaneous meters)** Many composers of our day, writing for large ensemble or orchestra, actually conceive music in which various instruments or instrumental groups play simultaneously in different meters. Obviously there is one constant—a *common unit* of time (or beat)—fundamental to the entire ensemble. This beat the conductor must establish and retain, even though all the barlines do not coincide.

Although polymeters *per se* are largely a twentieth-century manifestation, a striking example of this device may be found in a chamber work by—of all composers—Mozart. In the third movement of his *Oboe Quartet (*K. 370) the oboe part is notated in $\mathbf{C}$ and the accompanying strings in $\frac{6}{8}$. Because of the fairly rapid tempo of the movement, the meter of $\mathbf{C}$ is in actuality $\mathbf{\Cut}$; the $\frac{6}{8}$ meter, of course, is also felt in two beats to the measure. Even more noteworthy is the polymetric scheme at the end of Act I of *Don Giovanni*: three orchestral groups—one in the pit and two on stage—each plays in a different meter, combining $\frac{3}{8}$, $\frac{2}{4}$, and $\frac{3}{4}$.

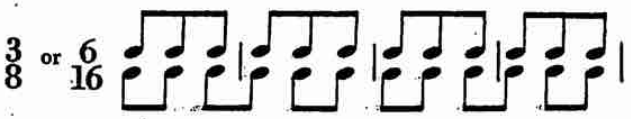
It is sometimes possible to notate polymeters clearly without actually writing different time-signatures for the different meters. This is still another function of unconventional beaming, especially when one of the individual lines is in the nature of an *ostinato* (a constantly repeated figure). A reiterated figure of three in a basic pulsation of four could be notated as follows:



EXAMPLE 10 - 17

Such a pattern may be found in Stravinsky's *Chant du rossignol* (at No. 24) and in Schönberg's *Five Pieces for Orchestra* (No. 1). A repeated pattern of *two* within the framework of a triple meter, as seen in Copland's *Dance Symphony* (second movement at No. 32), would be notated this way:

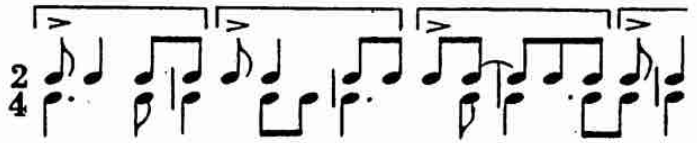




EXAMPLE 10 - 18

An outstanding example of a repeated pattern of *four* notes, carried over many measures of changing time-signatures, is to be found in Stravinsky's *"Dumbarton Oaks" Concerto* (the final movement).

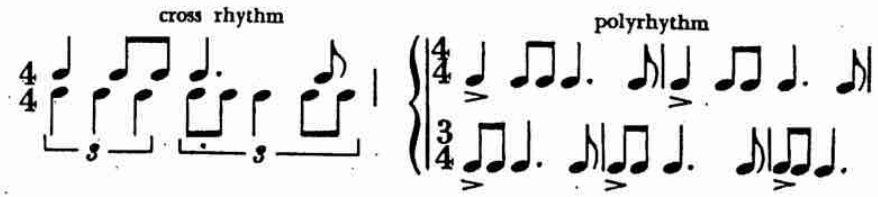
Another way of indicating polymeters without changing meters and barlines is as follows:



EXAMPLE 10 - 19

Here a $\frac{5}{8}$ pattern is superimposed on a basic $\frac{2}{4}$ meter. Instead of a $\frac{5}{8}$ signature and displaced barlines for the upper part, a bracket encloses the groups of five notes. In the hands of a proficient performer, the result will exactly duplicate the rhythmic pulse of an actual $\frac{5}{8}$ meter against the $\frac{2}{4}$.

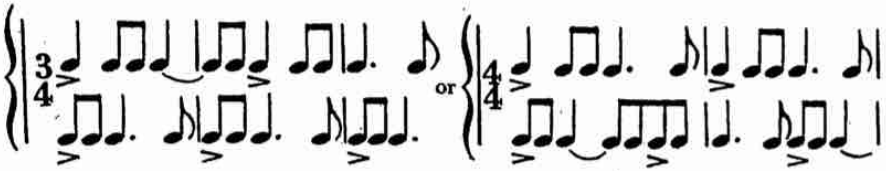
When the composer, however, wishes to heighten the drama—even the conflict—of the contrasting meter-patterns, he frequently prefers to write his simultaneous meters with their individual time-signatures. No contrasted time-signatures are necessary for the *cross rhythms* of the example at the left below, where two different patterns are used within a single meter. But a true polymeter, as illustrated at the right, needs opposing time-signatures.




EXAMPLE 10 - 20

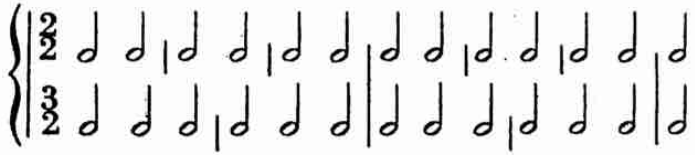
As is usual with polymeters, the unit of pulsation—in this case the quarter note—agrees in the two parts, but the primary stresses come at different places. One could, it is true, always notate such patterns within the framework of one inclusive meter, as shown below, but

the performance would lack the aural and emotional impact of a true polymeter (see Example 10-21).




EXAMPLE 10-21

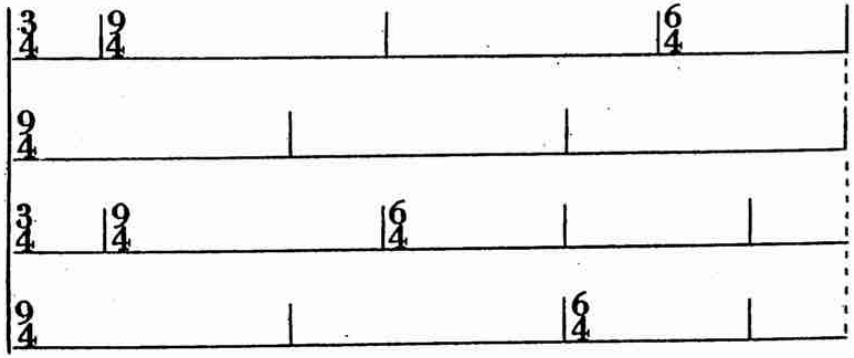
One of the most familiar instances of two simultaneous meters is the final section of the first movement of Hindemith's symphony *Mathis der Maler*. Here the Gregorian theme of the trombones is in $\frac{3}{2}$ time, while the balance of the orchestra progresses in $\frac{2}{2}$. As will be seen below, the barlines coincide after every two measures of the $\frac{3}{2}$ and after every three measures of the $\frac{2}{2}$ meter.



EXAMPLE 10-22

An unusual example of polymeter is found in the concluding pages of Benjamin Britten's *War Requiem*—an alternating meter of $\frac{2}{2}$ $\frac{3}{2}$ for the boys' choir set against an underlying $\frac{2}{4}$ time-signature in the accompanying orchestra.

Another contemporary example is drawn from Dallapiccola's *6 Carmina Alcaei*, in which overlapping meters of $\frac{3}{4}$, $\frac{9}{4}$, and $\frac{6}{4}$ are used.



EXAMPLE 10-23



A similar example of changing polymeters may be found in Webern's *Cantata No. 2*, in which the meters for each part of the chorus change canonically.

Other examples of polymeters may be found in the following twentieth-century works:

Béla Bartók: *String Quartet No. 3*— $\frac{2}{4}$ / $\frac{4}{4}$
Leonard Bernstein: *Serenade*— $\frac{9}{8}$ / $\frac{3}{4}$
Arthur Bliss: *Quintet for Oboe and Strings*— $\frac{6}{8}$ / $\frac{7}{8}$
Benjamin Britten: *Gloriana*— $\frac{5}{4}$ / $\frac{4}{4}$
——— *Nocturne*— $\frac{4}{8}$ / $\frac{12}{16}$
Aaron Copland: *Suite from "The Red Pony"*— $\frac{4}{4}$ / $\frac{6}{8}$
Henry Cowell: *Exultation*— $\frac{4}{4}$ / $\frac{3}{4}$, $\frac{3}{4}$ / $\frac{4}{4}$
Heimo Erbse: *Impression for Orchestra*— $\frac{2}{4}$ / $\frac{3}{4}$
Paul Hindemith: *Der Schwanendreher*— $\frac{3}{2}$ / $\frac{6}{4}$, $\frac{2}{2}$ / $\frac{6}{4}$, $\frac{2}{4}$ / $\frac{6}{8}$
——— *Symphonia Serena*— $\frac{2}{2}$ / $\frac{4}{8}$
Charles Ives: *4th Symphony*— $\frac{6}{2}$ / $\frac{4}{4}$, $\frac{3}{2}$ / $\frac{4}{4}$, $\frac{7}{4}$ / $\frac{6}{8}$
Carl Nielsen: *Symphony No. 6*— $\frac{2}{4}$ / $\frac{6}{8}$, $\frac{2}{8}$ / $\frac{3}{8}$
Serge Prokofiev: *Violin Concerto No. 2*— $\frac{12}{8}$ / $\frac{4}{4}$
Arnold Schönberg: *Five Pieces for Orchestra*— $\frac{3}{8}$ / $\frac{4}{8}$
Gunther Schuller: *Contours for Small Orchestra*— $\frac{15}{4}$ / $\frac{5}{2}$, $\frac{12}{4}$ / $\frac{4}{2}$
William Schuman: *Symphony No. 6*— $\frac{3}{2}$ / $\frac{3}{4}$
Richard Strauss: *Der Rosenkavalier*— $\frac{3}{4}$ / $\frac{4}{4}$

The most astounding example of all is the *Fourth of July* movement from Ives's orchestral *Holidays*, in which nearly every instrument plays in a different meter. No doubt the almost insurmountable difficulty of keeping everyone together has prevented frequent performances of this work.

**7. Mixed Meters** When meters consist of unequal units (simultaneous denominators) grouped within the measure, mixed time-signatures are produced:

EXAMPLE 10-24

This signature may be found in Tippett's *Symphony No. 2*. For the composer, the performer, and the audience this is *not* the same as writing $\frac{11}{16}$, as shown above at the right. The $\frac{11}{16}$ signature implies that

a constant sixteenth-note is the beat unit, and this is not what the composer conceived. The mixed meter combines a quarter-note unit with a dotted-eighth unit (or $\frac{3}{16}$), and the metrical feeling is quite different. Such careful distinctions between varying notations is a vital part of contemporary musical expression. It is not our purpose to advocate one method over another, but to help composers say what they mean, and to assist performers in reading this clear notation.

Significant examples of mixed meters may be found in:

Béla Bartók: *Piano Concerto No. 2* – $\frac{3}{4} + \frac{1}{8}$ =

Luciano Berio: *Serenata I* – $\frac{6}{8} + \frac{1}{16}$ =
$\frac{3}{8} + \frac{1}{16}$ =

Pierre Boulez; *Improvisation sur Mallarmé*, No. 1 – $\frac{3}{16} + \frac{4}{8}$ =
$\frac{2}{4} + \frac{5}{8}$ =

Pierre Boulez: *Improvisation sur Mallarmé*, No. 2 – $\frac{3}{2} + \frac{1}{4}$ =

Pierre Boulez: *Le Marteau sans maître* – $\frac{3}{16} + \frac{3}{8}$ =
$\frac{1}{4} + \frac{1}{16}$ =

Bo Nilsson: *Mädchentotenlieder* – $\frac{7}{4} + \frac{1}{16} + \frac{3}{4}$ =
$\frac{3}{4} + \frac{3}{32}$ =
$\frac{1}{8} + \frac{4}{4}$ =

Silvestre Revueltas: *Sensemayá* – $\frac{2}{4} + \frac{3}{8}$ =
$\frac{3}{4} + \frac{3}{8}$ =

Roger Sessions: *Piano Sonata No. 2* – $\frac{3}{4} + \frac{1}{16}$ =
$\frac{5}{8} + \frac{1}{16}$ =

Igor Stravinsky: *Threni* – $\frac{1}{8} + \frac{3}{4}$ =

Michael Tippett: *Symphony No. 2* – $\frac{3}{8} + \frac{2}{4}$ =
$\frac{3}{8} + \frac{2}{8} + \frac{3}{16}$ =

Edgard Varèse: *Ionization* (for percussion ensemble) – $\frac{2}{4} + \frac{3}{8}$ =



**8. Fractional Meters** Our final category in the roster of unusual contemporary meters can only be called *fractional meters.* These are of two kinds: meters in which a fraction *is added* to the numerator—such as $\frac{2\frac{1}{2}}{4}$; and those in which a fraction of a musical entity *is* the numerator—$\frac{\frac{3}{4}}{4}$, for instance.

The first classification is actually only another way of writing a mixed meter. The $\frac{2\frac{1}{2}}{4}$ could also be notated as $\frac{2}{4} + \frac{1}{8}$, for the complete measure contains $2\frac{1}{2}$ times the value of a quarter note. The meter could also be written as a compound signature: $\frac{4+1}{8}$, although the rhythmic feeling is not precisely the same.

Examples of this first variety of fractional meter may be found in:

$\frac{2\frac{1}{2}}{2}$ Gardner Read: *Piano Quintet*

$\frac{5\frac{1}{2}}{4}$ Gardner Read: *Driftwood Suite*

$\frac{4\frac{2}{3}}{4}$ Toshiro Mayuzumi: *Nirvāna-Symphonie*

$\frac{4\frac{1}{2}}{4}$ Charles Ives: *4th Symphony;* Toshiro Mayuzumi: *Nirvāna-Symphonie;* Gardner Read: *Driftwood Suite*

$\frac{3\frac{1}{2}}{4}$ Toshiro Mayuzumi: *Nirvāna-Symphonie;* Gardner Read: *Driftwood Suite;* Edgard Varèse: *Intégrales; Octandre; Offrandes*

$\frac{2\frac{1}{2}}{4}$ Toshiro Mayuzumi: *Nirvāna-Symphonie;* Gardner Read: *Touch Piece;* Wallingford Riegger: *Study in Sonority;* Edgard Varèse: *Octandre*

$\frac{1\frac{1}{2}}{4}$ Edgard Varèse: *Octandre*

$\frac{5\frac{1}{2}}{8}$ Silvestre Revueltas: *Sensemayá*

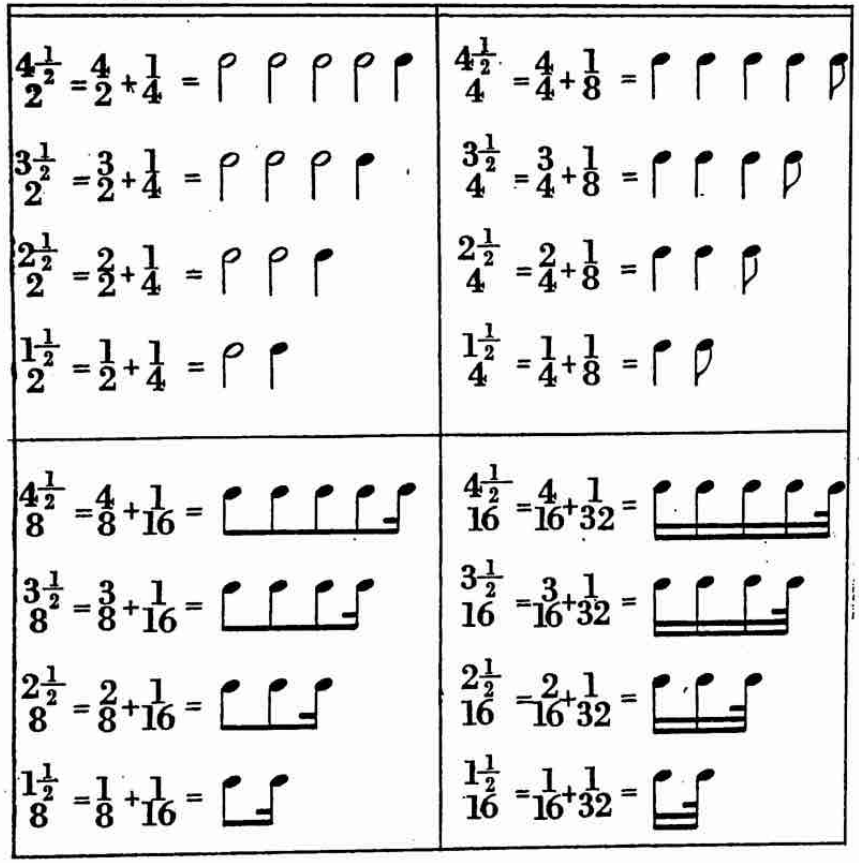
$\frac{3\frac{1}{2}}{8}$ Toru Takemitsu: *Masque for 2 Flutes*

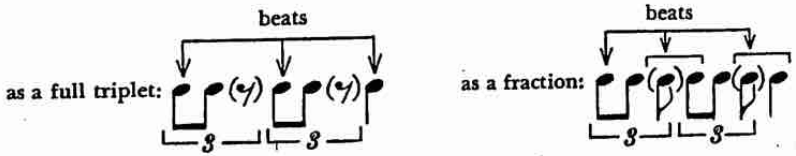
$\frac{2\frac{1}{2}}{8}$ Toru Takemitsu: *Masque for 2 Flutes*

Fractional meters are well justified when the rhythmic pattern begins or ends with the half-beat, for a $\frac{5}{8}$ divided as 4 + 1 or 1 + 4 makes good sense notated as $\frac{2\frac{1}{2}}{4}$. Because the problem of fractional meters may be new to many notators and performers, a Table of Fractional Meters has been included.

The *second* classification of fractional meters (such as $\frac{\frac{2}{3}}{4}$) is more complicated—both to devise and to explain. In order to have two-thirds of a figure we must first find its whole, or three-thirds. To divide a quarter note into thirds means thinking of it as a triplet in which the three segments are tied together: Two-thirds of this triplet equal: . Therefore $\frac{\frac{2}{3}}{4}$ means the time-duration of two eighth-notes of a triplet figure, without accounting for the "lost" third note. The diagram on page 176 (Example 10-26) may show more clearly than words what takes place metrically.

**EXAMPLE 10-25. TABLE OF FRACTIONAL METERS**






**EXAMPLE 10-26**

The $\frac{3}{4}$ signature just discussed, as well as $\frac{3}{2}$, appear in *Le Marteau sans maître* by the French composer Boulez—foremost practitioner of this type of fractional meter. Curiously, the fractional figure occupies an entire measure; the measure, then, is actually complete-but-incomplete by one-third of a triplet.

The Swedish avant-garde composer Bo Nilsson has used several forms of fractional meter in his *Mädchentotenlieder*. In addition to



the "conventional" use of $\frac{3}{4}$, $\frac{3}{2}$, $\frac{4}{4}$, $\frac{2}{4}$, and $\frac{1}{4}$, (!) in the manner of Boulez, he has combined fractional and mixed meters as follows:

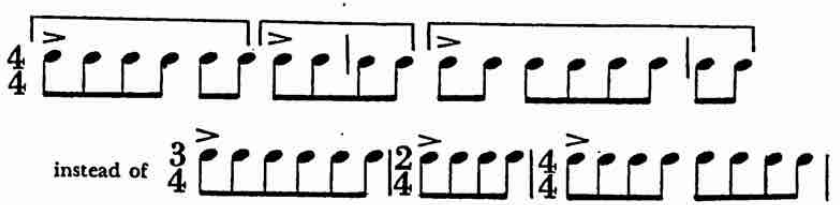
$$\frac{1}{32} + \frac{3}{4}; \frac{3}{4} + \frac{1}{8}; \text{ and } \frac{3}{4} + \frac{1}{4}.$$

It is not the purpose of this manual to give a verdict of right or wrong for any technical innovation. Yet one cannot help question whether or not these extreme subleties are actually perceived in performance. Mathematically, the concept of such fractional meters may be explained, and to a degree understood, by the performing musician. But unless produced by a machine (and such music exists, of course, in tape-recorder composition) it is extremely doubtful if the highly complex metric organization of these fractional meters can be justified by what is actually heard.

9. **Decimal Meters** Fractional meters may also be expressed by using decimals. For example, we may notate $\frac{2\frac{1}{2}}{4}$ also as $\frac{2.5}{4}$, as the Japanese composer Yoshiro Irino does in his *Music for Violin and Violoncello*. Or, in place of $\frac{4\frac{1}{2}}{4}$ we may substitute $\frac{4.5}{4}$, or write $\frac{3.5}{2}$ in place of $\frac{3\frac{1}{2}}{2}$. Although found in a few recent avant-garde scores, decimal meters are even rarer than their fractional counterparts.

10. **Conducting Patterns** Not all contemporary composers who create complex rhythms are indifferent to the problems they create. Many of them have devised various methods to help the performer (instrumentalist, vocalist, or conductor) clarify their asymmetrical meters or inner rhythmic complexities. One of the most helpful devices is placing brackets or other signs over the metrical figures (or units of time), thus graphically making intelligible their varying patterns.

Rhythmic or metrical patterns that might ordinarily require changing meters are sometimes notated with elongated brackets over the uppermost staff:




**EXAMPLE 10-27**

Alternating irregular patterns within a single meter are also marked in this way:

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text, such as Hindemith's *Elementary Training for Musicians* (page 147).

Beginning with **C** major (or **a** minor), requiring no sharps or flats and hence no signature, one progresses in the "circle" to **G** major (or **e** minor) a fifth *higher,* and adds one sharp to the signature; or to **F** major (or **d** minor) a fifth *lower,* adding one flat to the signature. A fifth higher than **G** major is **D** major, which takes a signature of two sharps; a fifth lower than **F** major is **B♭** major, requiring two flats. By using the same process we traverse the entire circle of key fifths, ending with seven sharps on one side and seven flats on the other—one accidental for each note of the seven-note scale.

From the order in which sharps or flats are added as we progress in the key circle we derive the order of sharps and flats in the key signatures. In early music history, however, the key signature did not always include all the accidentals necessary for a given key. Much eighteenth-century music omitted from the key signature the final sharp or flat, this being written into the music as an accidental. Handel's *Harmonious Blacksmith* in **E**, for example, has a signature of only three instead of four sharps, and a number of Bach's cantatas have solo arias in which the flat signatures contain one flat less than the tonality requires. At the other extreme, some music of the period employed a kind of duplicate key-signature, in which a sharp or flat would appear twice.

EXAMPLE 9-25

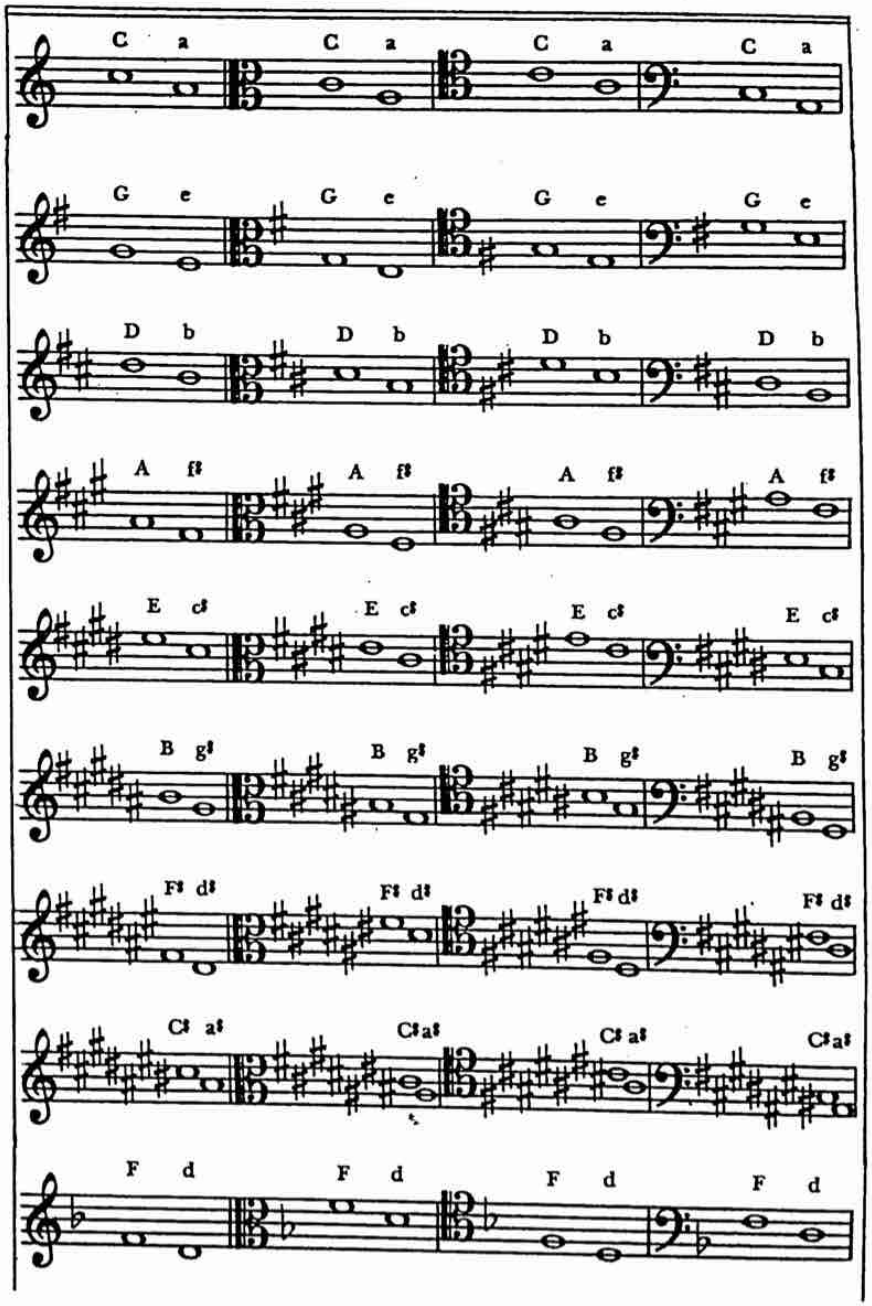
Today, however, the conventional signature displays all the altered pitches for the key, and is a direct indication of the keynote (tonic) as well. For convenience and ready reference, the complete Table of Key Signatures shows accepted modern practices for the placement of the accidentals on the four standard clefs: treble, alto, tenor, and bass.

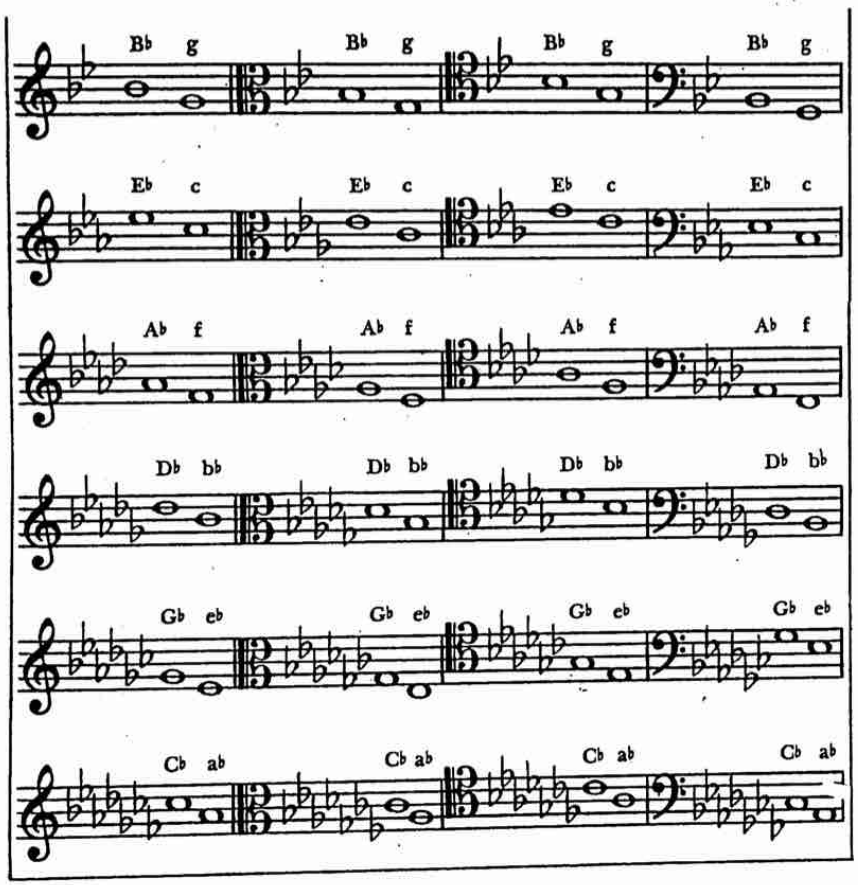
## TRADITIONAL PRACTICES FOR KEY SIGNATURES

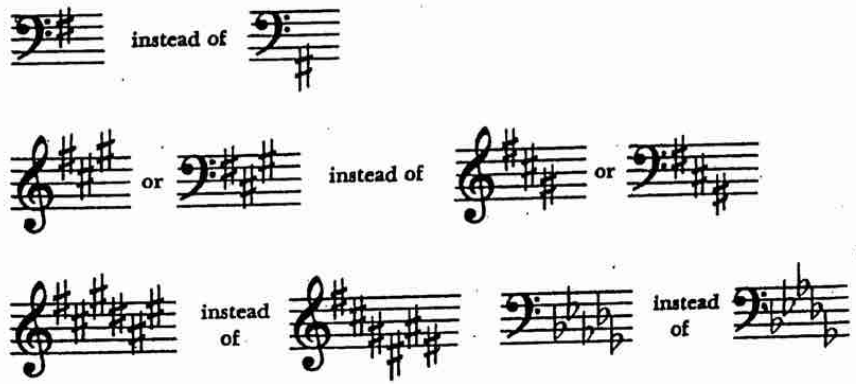
The position of key-signature accidentals on the staff is determined largely by visual logic: the general principle involved is to keep all the accidentals on the staff, and closely grouped for reading ease. In the alternate choices illustrated in Example 9-27 it is usually evident that clarity and neatness have been the deciding factors.



EXAMPLE 9-26. TABLE OF KEY SIGNATURES



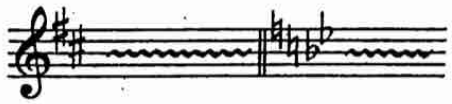



EXAMPLE 9 - 27

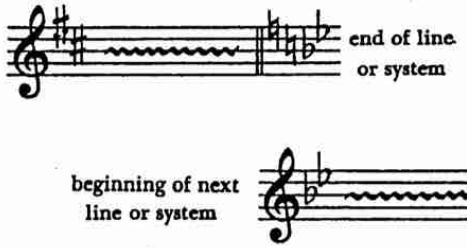


A *change* in key signature, even in orthodox and tonal music, now reflects a somewhat relaxed modern practice. Traditionally, a new signature was given after a double bar consisting of two thin vertical lines, and was preceded by natural signs canceling the previous signature.



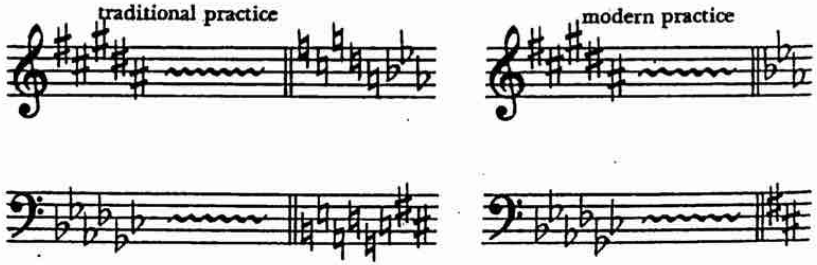
EXAMPLE 9 - 28

Formerly, should the key change occur at the end of a line or system, the canceled accidentals and the new signature would appear both at the end of this line (following a double bar as above) and at the beginning of the line or system following (without cancellations). Notice (below) that the staff is left open following the new signature on the first system, no final barline being necessary.



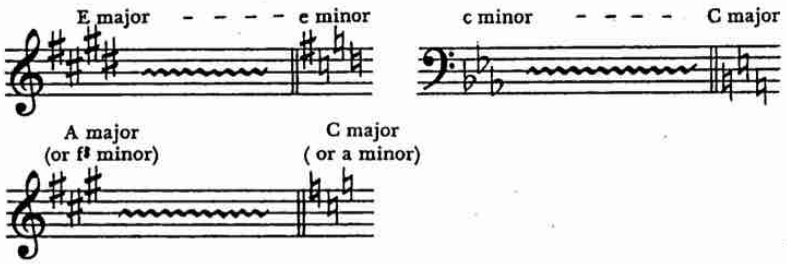

EXAMPLE 9 - 29

Today, however, the use of excess accidental signs in a change of signature is considered pedantic and unnecessary. Instead of indicating the cancellation of *every* previous accidental before giving the new signature (as in Example 9-29), the notator now usually allows the double bar to serve as automatic cancellation of all previous accidentals.



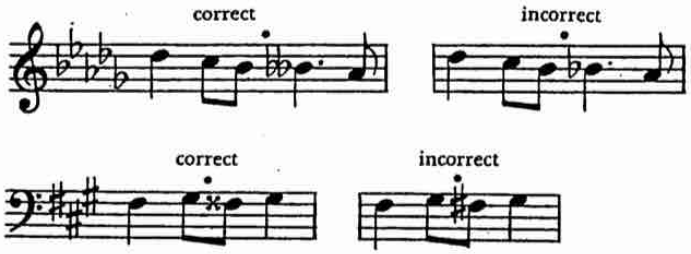

EXAMPLE 9 - 30

The sole exceptions to this newer and less cluttered practice would be: in changing from a major key to its parallel minor (having the same keynote); from a minor tonality to its parallel major; or from any tonality to C major or a minor (with no accidentals). In going from E major (four sharps) to e minor (one sharp), for instance, reading accuracy is enhanced by including the naturals that cancel the previous sharps. Or in going from c minor (three flats) to C major (no accidentals) the presence of the three natural signs helps both the reading and the comprehension of the shift in tonality. Without the canceling accidentals the key changes might in these instances be overlooked or misinterpreted.




EXAMPLE 9-31

As coda to our survey of key-signature practices, we insert a warning regarding the need for *double* flats or *double* sharps. Writing only one flat does not constitute a double flat, even though the key signature may already call for a flat on that same staff-degree. One must actually write the double-flat sign where it is needed, no matter how many single flats appear in the signature. And, in the same way, we must notate a double sharp where it is needed, no matter how many sharps appear in the signature.




EXAMPLE 9-32

Staff bears a signature of ...



## MODERN INNOVATIONS

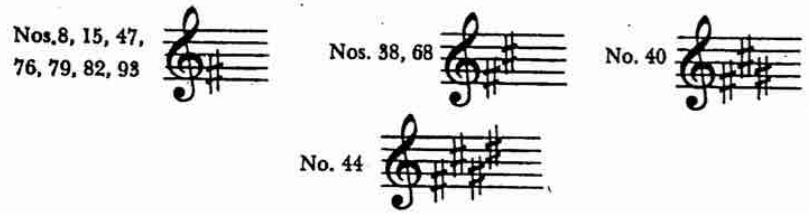
**Abandonment of Signatures** Modern music has contributed to notation several significant modifications of the traditional system of key signatures. Foremost is the abandonment of *all* key signatures in music that is essentially atonal, non-tonal, or frequently changes its key center. Key signatures have no validity in music that avoids traditional tonalities, for they exist because of the wish to *establish* a tonality. Of what use is a key signature when nearly every note of every measure requires a cancellation of that signature? If key signatures are absent from all but a minute percentage of the serious music being written today, it is simply because this music does not move within the traditional framework—keys, harmonies, and chord progressions—that brought key signatures into being.

**Unorthodox Key Signatures** Not all contemporary music, however, consistently avoids the use of signatures. Often the composer will merely alter the traditional placement or make-up of a key signature when he considers that this change makes musical sense. The signature of one sharp (for G major or for its relative minor, e) might conceivably be placed in the first space of the treble clef rather than on the top line when only the lower f♯ occurs in the music (left, below). As a matter of fact, Béla Bartók observed this practice in several pieces of his *Mikrokosmos* (Nos. 8, 15, 47, 76, 82, and 93).

In the same way, a signature of one flat (B♭) might be placed in the space above the bass staff rather than on the second line, if musical logic permitted (center example). The second flat in any flat signature (E♭) could also be placed unconventionally in treble, alto, or tenor clef should the other pitch level on that staff never be used in the music (examples at the right).

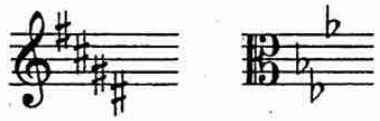
EXAMPLE 9-33

Mention has already been made of Bartók's placement of the F♯ in a one-sharp signature on the bottom space of the treble clef. In the six volumes of the *Mikrokosmos* the composer frequently positioned his conventional one, two, three, or four sharps in non-conventional locations on the staff.




EXAMPLE 9 - 34

As long as the displacement of the accidentals in any key signature does not move them completely off the staff, any unconventional arrangement might be justified were only those particular altered pitches to be sounded. Although it is difficult to imagine a work calling for only the sharped notes illustrated at the left, below, the four-sharp key-signature might possibly serve. The flat signature in the viola clef (right-hand example) might also be possible, if improbable!



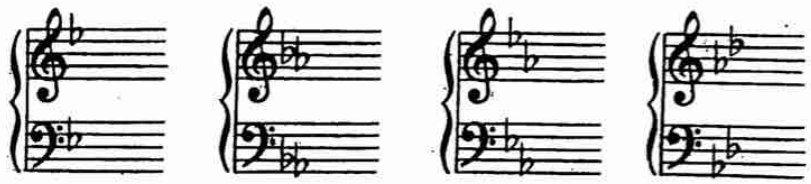
EXAMPLE 9 - 35

In addition to his unorthodox *placement* of accidentals, Bartók (and many other composers as well) also created *new signatures* of sharps or flats in combinations unsanctioned by proper sequence in the circle of fifths.

EXAMPLE 9 - 36

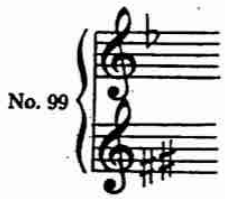
Similar possibilities for unusual flat signatures are indicated below:





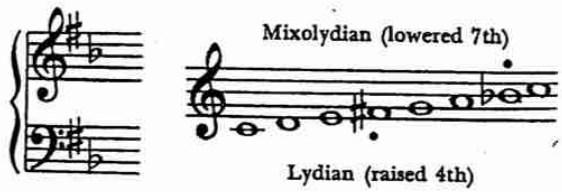
EXAMPLE 9 - 37

**Mixed Signatures** Though the examples above consistently use one type of accidental—sharps or flats—the *Mikrokosmos* also exhibits mixed signatures with flats and sharps together. Below we have a single flat in the right hand (and an E♭ instead of a B♭, at that) against two sharps in the left hand—unconventionally placed and in non-traditional sequence!




EXAMPLE 9 - 38

A further extension of the mixed-signature principle would be the simultaneous combination of sharps and flats on both the staves of a keyboard work, or in each of the two parts of an instrumental or vocal duo. Far from being a random experiment, the signature below is tonally valid for a combination of two modal scales—the Lydian and the Mixolydian—both commencing on C.*



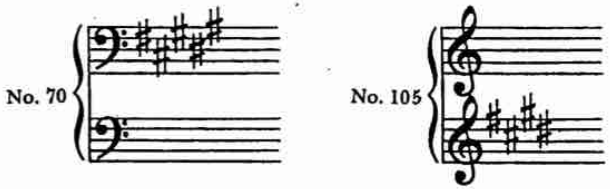

EXAMPLE 9 - 39

A few other possibilities for such mixed signatures are given below:

* The Lydian mode is the white-note scale beginning on F (having no B♭); the Mixolydian mode is the white-note scale starting on G (having no F♯).

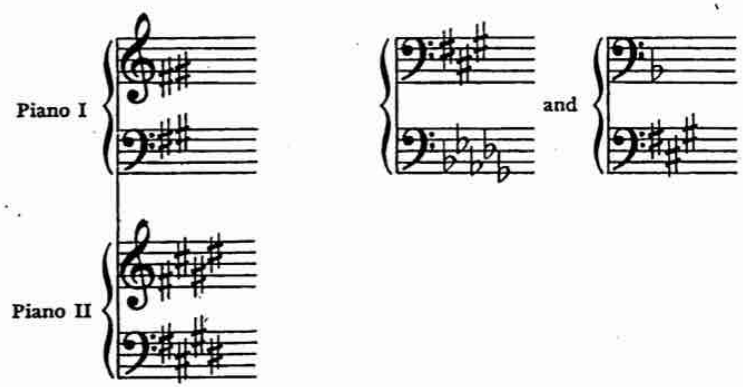
EXAMPLE 9 - 40

Another variant of the mixed signatures uses a signature in one hand of a keyboard piece (or one instrument of an ensemble) and no signature at all in the other hand or instrument.




EXAMPLE 9 - 41

Both of the above examples from Bartók's *Mikrokosmos* actually illustrate *polytonality* (two or more keys used simultaneously), as indicated by poly-signatures. Other applications of this principle in keyboard music are seen in the *Mikrokosmos* No. 44, for two pianos (left, below) and in Serge Prokofiev's *Sarcasmes,* No. 3 (at the right).




EXAMPLE 9 - 42

As polytonality is a fairly common device in contemporary literature, the enterprising musician will also find numerous illustrations of poly-signatures in orchestral and chamber music. In Leonard Bernstein's *Serenade for Solo Violin, String Orchestra, Harp and Percussion,* for instance, the solo violin is notated in two flats, while the solo 'cello staff bears a signature of two sharps. At the beginning of the third

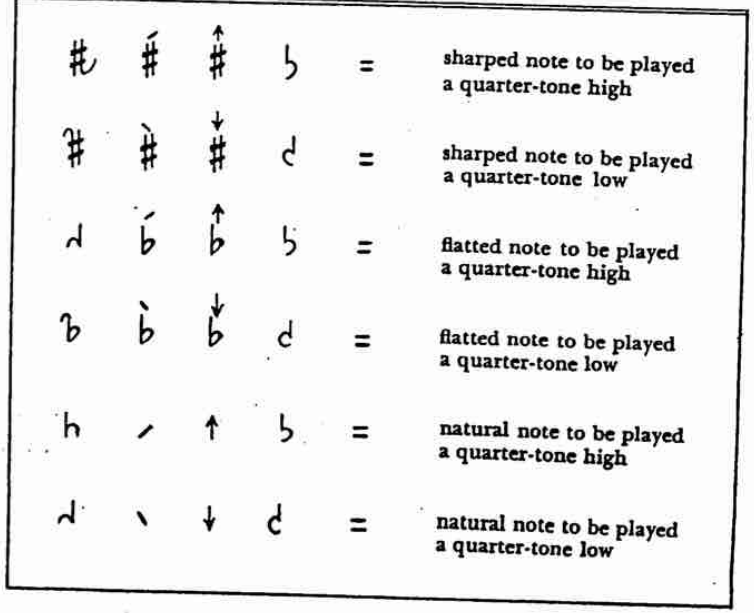


movement of Arthur Honegger's *Symphony No. 2 for String Orchestra* the first violins have a written signature of six sharps, but the balance of the orchestra has a "neutral" signature: no sharps or flats. In terms of notation, however, polytonality is more often expressed by the use of measure accidentals than by actual poly-signatures.

**Quarter-Tones** Contemporary composers have done considerable experimenting with microtonal music, based on the division of the octave into quarter-tones rather than the conventional half-steps. In our usual diatonic or chromatic music, based on 12 equal half-steps to the octave, we recognize a half-step between the notes F♮ and F♯, and between G♭ and G♮. In our tempered tuning there is no aural difference between F♯ and G♭, yet a stringed instrument (or a specially constructed instrument such as the quarter-tone piano, the Theremin, or the *ondes Martenot*) can make an actual microtonal distinction. To notate this difference it was necessary to invent symbols to indicate microtones. The necessity is even more acute now that the woodwind and brass instruments are required by avant-garde composers to produce various microtonal intervals (see Example 20-21).

Rather than create an entirely new set of symbols for the 24 quarter-tones of the octave, most of the composers using these microtones have

**EXAMPLE 9 - 43. TABLE OF QUARTER-TONE SYMBOLS**



continued to employ traditional flats and sharps, but with modified forms and new auxiliary signs placed before conventional note-heads. A few of these are shown in the Table of Quarter-Tone Symbols.

As a practical illustration, the following example shows a segment of the octave scale written in quarter-tones.

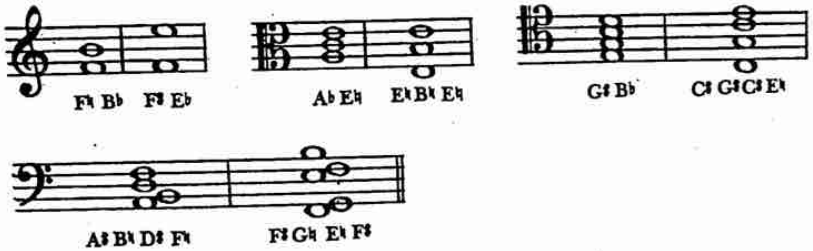
EXAMPLE 9 - 44

Alban Berg in his *Chamber Concerto for Violin, Piano, and 13 Winds* utilized still another ingenious form of quarter-tone notation. As the German term for quarter-tones is *Zwischentöne* (literally, "between-tones"), Berg placed a large letter **Z** on the stem of each note to be so played: 𝄪 or 𝄫

Should quarter-tone music become more generally adopted, a stabilized notation will doubtless follow.

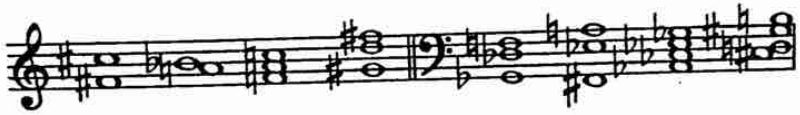
## NOTATION EXERCISES

1. Write all the flat key-signatures on: the treble staff; the tenor staff.
2. Write all the sharp signatures on: the alto staff; the bass staff.
3. Write in all the accidentals called for in the series of intervals and chords below:




EXAMPLE 9 - 45

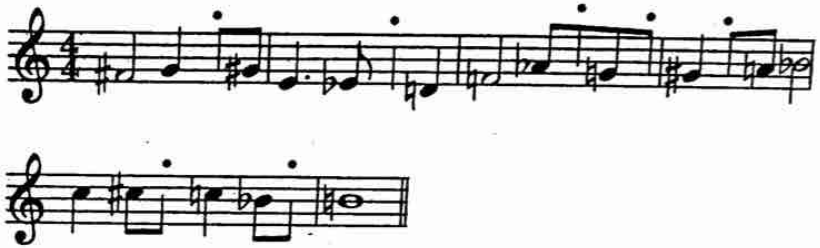
4. Correct the erroneous placement of accidentals before all the intervals and chord structures below:



EXAMPLE 9 - 46



5. Using one or the other system of quarter-tone notation, write in the necessary indications for quarter-tones where marked with an asterisk (*) in the example below:

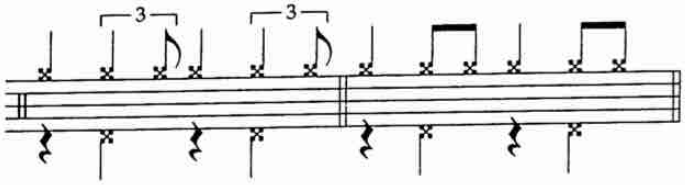


EXAMPLE 9 - 47

d. slashes with rhythms specified

1. these specify accents using the full drum set, without any time-keeping
2. drum and cymbal choice ad-lib appropriate to the style
3. short sounds (drums, choked cymbals) used to accent notes of short duration
4. reverberant sounds (open cymbals) used to accent sustained notes

e. notes with specified rhythms




1. used when
   a. chart contains a unique or non-repetitive drum pattern
   b. a specific pattern is desired by the arranger
   c. in a transcription of a recorded drum part
2. not often used in professional charts